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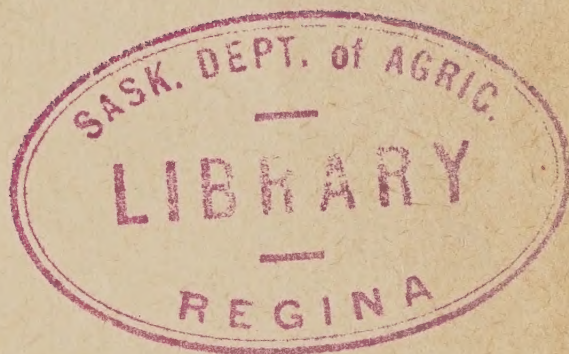
FIELD AND FARM YARD

J. G. TAGGART, B. S. A.



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*I*T has not been possible in one volume to deal specifically with every phase of agriculture as encountered in every part of Canada. Of necessity, much of the information accumulated here is based upon agricultural experience on the Prairies and in Ontario. It is hoped, however, that this book will be of use to agriculturists everywhere in the Dominion. In that belief, it is respectfully dedicated to the Farmers of Canada.

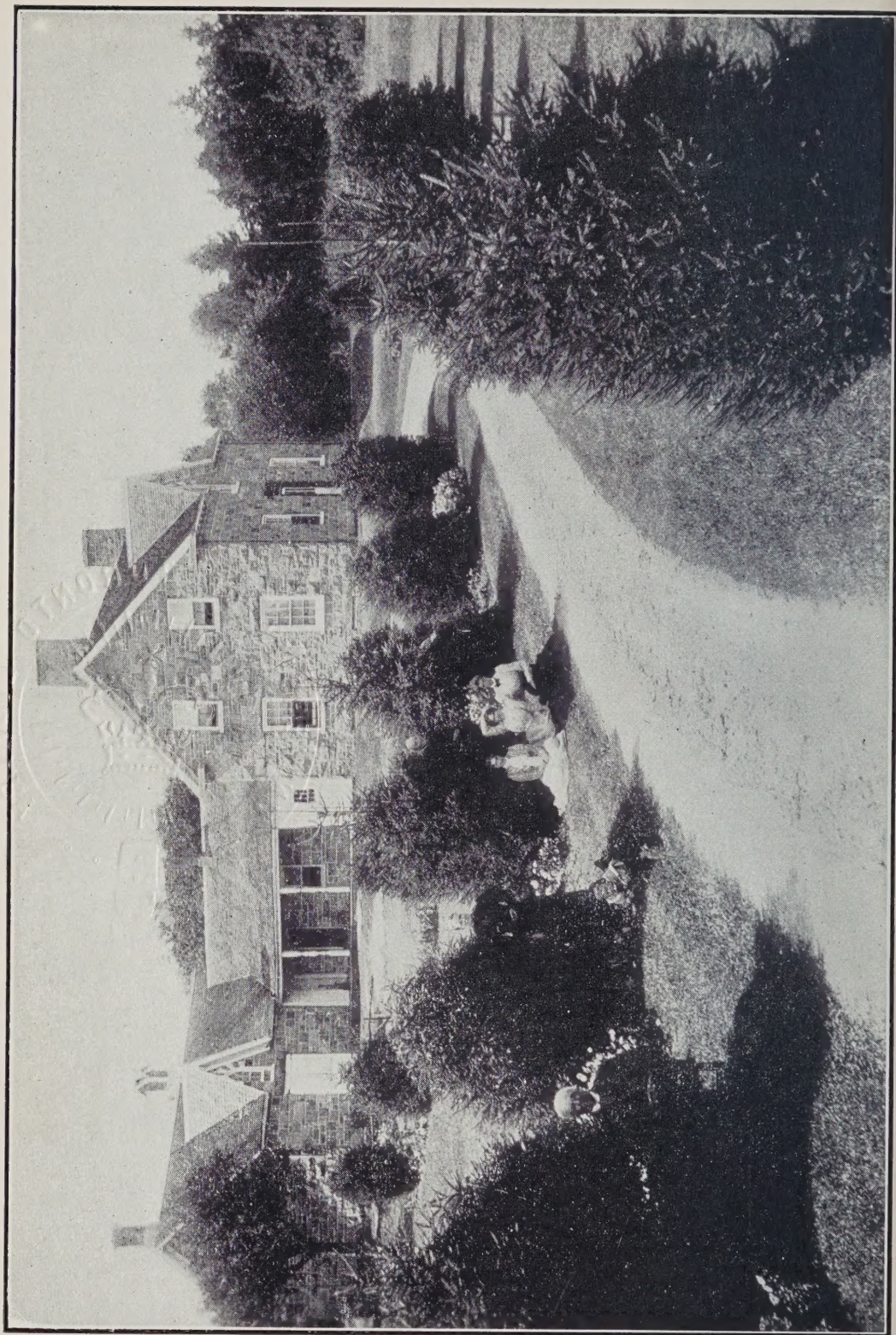
Marshall, Duncan McLean
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FIELD *and* FARM YARD

Published by
IMPERIAL OIL LIMITED

Written and Compiled by
DUNCAN MARSHALL
Minister of Agriculture
Province of Alberta
1909-1921

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INTRODUCTION

THE enterprise and good judgment shown by Imperial Oil Limited in having compiled for distribution the vast amount of information of such a varied character in the accompanying publication, is to be most highly commended.

The information included is of such a useful character and covers such a wide field in agriculture, that the book cannot fail to be of interest and value to any and every farmer into whose hands it may fall. One of the best features of the book is that the information contained in it is not only of immediate use, but may, and should be kept for reference purposes. Such information as is contained herein seldom grows stale, so that this little volume might well find its place on the most accessible shelf of the farm library.

Much care has been shown in the choice of the animals illustrated. In fact, this collection of reproductions of various farm animals is in itself enough to make the book worth while to any livestock man. When to this is added brief histories of the livestock breeds and interesting accounts of individuals, their development and show yard careers, then its value is increased manifold. This part of the book dealing with livestock is worth real study.

The pages dealing with rotations, soil cultivation and crop production generally will be of interest and value to stockmen who are anxious to make their farms come as near carrying their livestock as possible.

Good feeds mean good stock. It seems most fortunate, therefore, that space has been given to a most interesting and lucid discussion of feeds and feeding, as well as of cereals, that cannot fail to be of much interest to farmers both East and West.

N. R. McThumell

Minister of Agriculture for Canada.

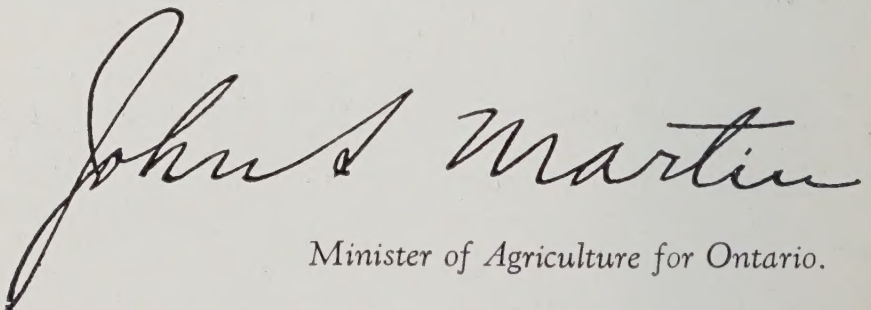
INTRODUCTION

THIS booklet, as I understand it, is a contribution from industry to the cause of better agriculture. It illustrates, in concrete form, the co-operation of industry and agriculture. It is, therefore, entitled to a hearty welcome and cordial appreciation.

It is well to recognize the community of interest which exists between the different activities of this Country. More prosperity on the farm means better business in the town and city and in all different branches of commerce. Prosperity among the different branches of commerce similarly means better markets for our farm products and thus the circle is completed.

There can be no doubt that agriculture today demands the keenest intelligence, as well as the most persevering industry. New conditions are constantly arising and these conditions demand a knowledge of many factors. I place a very high value on education as a means to the solution of many of the problems with which we are confronted. Reduction in the cost of production is just as certain a way of making money as adding to the selling price and some times it is more completely within our own power.

Because of the variety of our interests and the variety of our problems, taking this broad Country as a whole, it necessarily follows that there must be a variety of interests working for better conditions. This booklet, I feel sure, will find its place among the growing literature of agriculture and make its own contribution in its own admirable way.

A large, elegant handwritten signature in cursive script, reading "John A. Martin". The signature is written in dark ink and occupies the lower half of the page, positioned to the left of the printed title.

Minister of Agriculture for Ontario.

PREFACE

FARMING is a business in which one is never quite done learning. The science of agriculture is still comparatively unexplored, and the teaching of agriculture is largely a matter of giving students the benefit of the experience of others in farm operations.

This book is by no means the last word, or the whole story, in agriculture. Its first idea is to offer a convenient collection of farm experiences that may be easily referred to by farmers who want to know how other tillers of the soil and breeders of live stock did certain things.

Canada has very great variations in soil and climate. Treatment of land in one province might of necessity be totally different from that required in another. No farming experience in one part is quite safe to be applied without alteration to another, which has made the compilation of the matter in this publication somewhat difficult, but we have endeavored to keep this in mind, and there is nothing dogmatic in our suggestions. They are simply based upon the experience of Canadian farmers, and the experiments of colleges and farms established for the purpose of developing the scientific side of Canadian agriculture.

We are indebted to the Dominion Experimental Farms and the Provincial Colleges and Schools of Agriculture for information which has materially assisted us in compiling these pages. We also owe a debt to a number of farmers, in different parts of the country, from whom we have received information, the result of their practical experience, that we consider quite worth while passing on to others who are interested in similar farming operations; and also to live stock breeders who have furnished us with statements, over their signatures which we regard as one of the most valuable features of this book.

Imperial Oil Limited has published this book as a matter of service, recognizing agricultural difficulties in a new country like Canada, and desiring to make available to those who are interested, information and suggestions that may be of value.

The publishers also appreciate the value and importance of agricultural education and hope that the reading of these pages may awaken the interest of farm girls and boys in the necessity

for scientific training as a foundation for successful and satisfactory farming.

Farm life offers a freedom and independence, highly prized by people who love country life, but it can offer more to those who are trained to approach farm problems from a scientific standpoint, as the science of agriculture is one of the most complex, as well as one of the most fascinating problems that men have set their minds to solve. We, therefore, hope to see the attendance at our Schools and Colleges of Agriculture doubled during the next few years, so that the youthful farming population of Canada may reap more of the many and varied rewards that always follow better knowledge of one's business. Professor Huxley must have had agriculture in mind when he said: "Science is organized common sense."

Much of the matter will not be new to quite a few of our readers, but the methods and plans outlined here may help some to improve their crops and live stock and so swell their returns and increase their satisfaction in their occupation. It is the operator of a moderately sized, or small piece of land, that forms the larger part of our farming population. He needs most to know the small things in his farm operations, and he is always interested in learning how some one else succeeded in certain cropping or live stock plans. It is in the hope that he may find something interesting, suggestive, and useful in these pages, that Imperial Oil Limited has issued this publication.

TABLE OF CONTENTS

	Page
Chapter I. Soil Cultivation.	15
<i>Structure and Texture of Soil 15—Keep Off Wet Lands 15—How Crops Grow 16—Drainage 16—Moisture 16—Value of Humus 17—Fall Plowing 18—Spring Plowing 18—Spring Cultivation 19—Stiff Clay 20—Seed Bed 20—Cultivation of Growing Crop 21.</i>	
Chapter II. Seed Selection.	23
<i>How Seeds Grow 23—Germination Test 23—Clean the Seed 24—Treating for Smut 25.</i>	
Chapter III. Summer fallowing.	27
<i>Killing Weeds 27—Sweet Clover on Fallow 27—Restoring Nitrogen 27—Keep Fallow Black 30—Missing One Crop 31—Fallowing on Prairies 31—Plan on Big 4 Farms 32—Dry Farming Methods, by Robt. Gratz 33.</i>	
Chapter IV. Weeds.	39
<i>Classification 39—Perennial Sow Thistle 40—Cleaning Fields 41—Weeds on Prairies 42—Canada Thistle 43—Bunch Perennials 43—Couch or Quack Grass 44—Biennials 45—Stink Weed 46—Wild Oats 47—Livestock and Weeds 49—Weeds taught in Public Schools 50.</i>	
Chapter V. Fertilizer.	51
<i>Barnyard Manure 51—Commercial Fertilizer 53—Nitrate 54—Superphosphate 54—Potash 55—Acid Soils, Lime 56.</i>	
Chapter VI. Grain Crops.	57
<i>Wheat and Varieties 57—Seeding Wheat 60—Fall Wheat 62—Oats 63—Varieties 65—Barley 66—Peas 67—Rye 69—Mixed Grain 70—Production of Marquis Wheat by Dr. Chas. E. Saunders 71.</i>	
Chapter VII. Succulent Feeds.	75
<i>Corn Ensilage 75—Sweet Clover Ensilage 76—Sunflowers for Ensilage 77—Green Oats for Ensilage 79—Silo Construction 80—Root Crops 82—Storing Roots 85.</i>	
Chapter VIII. Rotation of Crops.	87
<i>Legumes in Rotation 89—Rotation on Prairies 90—Sweet Clover in Rotation 91.</i>	
Chapter IX. Permanent Pasture and Hay.	93
<i>Essentials of Pasture 93—Mixtures 93—Dutch Clover 94—Meadow Fescue 94—Tall Oat Grass 94—Kentucky Blue Grass 96—Canadian Blue Grass 96—Red Top 96—Timothy 96—Brome Grass 98—Western Rye Grass 98—Care of, and Feeding on Pasture 100—Alfalfa 100—Alfalfa Seed 102—Sweet Clover 105.</i>	

Chapter X. Potatoes—Poultry. 109

Land for Potatoes 109—How they Grow 110—Planting 111—Cultivating 111—Spraying 112—Storing 112—Kitchen Garden 113—Trees and Shrubs 114—Poultry 114—Breeds 115—Strains 116—Housing 116—Feeding 117—Culling 118—Turkeys 118—Ducks and Geese 119.

Chapter XI. Pure Bred Livestock. 121

Pure Breds, their value 121—Clydesdale 125—Percheron 126—Belgian 127—Shire 128.

Chapter XII. Beef Cattle. 131

Shorthorns 131—Herefords 135—Aberdeen Angus 136—Feeding Steers by Thos. McMillan, M.P. 139.

Chapter XIII. Dairy Cattle. 143

Holstein-Friesians 144—Ayrshires 145—Jerseys 149—Guernseys 151—Feeding Dairy Cattle by S. G. Carlyle 155.

Chapter XIV. Sheep on the Farm. 161

Winter Quarters 161—Lambing time 162—Chilled Lambs 163—Adopted Lambs 164—Feeding Ewes 164—Docking Lambs 165—Sheep on Pasture 165—Dipping 166—Weaning Lambs 166—Intestinal Parasites 166—Goitre in Lambs 167—Breeds 168.

Chapter XV. Hogs. 171

Market for pork 171—Bacon Breeds 171—Government Grading 171—Breeding Pigs 172—Housing Pigs 173—Hog Pastures 173—Weaning Pigs 175—Finishing for Market 175—Minerals in Feed 176—Breeding and Market Hogs 176—Self Feeders 177.

Chapter XVI. Selection of a Sire. 179

Purebred Sires 179—Some Characteristics 180—A Draught Stallion, by W. L. Carlyle 182—A Shorthorn Bull by W. A. Dryden 184—An Aberdeen Angus Bull, by Hon J. D. McGregor 185—A Hereford Herd Header, by W. W. Boyd 187—A Holstein-Friesian Bull, by R. M. Holtby 188—An Ayrshire Bull, by R. R. Ness 190—A Jersey Sire, by Col. Bartley Bull 191—A Guernsey Sire, by Dr. R. M. Jenkins 193—A Ram, by Col. Robt. McEwen 194—A Boar, by Geo. B. Rothwell 195.

Chapter XVII. Tractor and Combine. 198

Tractor, its uses by J. G. Taggart 198—Harvesting with a Combine, D. N. McIntyre 204.

Chapter XVIII. Care of Machinery. 210

The Fanning Mill 210—The Grain Drill 211—The Plow 211—The Tractor 212—Disc 213—Manure Spreader 213—Mower 213—Rakes 215—Binder 215—Combine 216—Wintering Machines 216—Lubrication Chart for Tractors 217.

CONTRIBUTORS

	Page
1. Robert Gratz, Nobleford, Alberta, Dry Farming Methods.	33
2. Dr. Chas. E. Saunders, Toronto, Ontario, formerly Dominion Cerealst. Interviewed by W. L. Smith.	71
3. Thomas McMillan, M.P., Seaforth, Ontario. Feeding Beef Cattle for Market.	139
4. S. G. Carlyle, Alberta Livestock Commissioner, Feeding Dairy Cattle.	153
5. W. L. Carlyle, Manager of E. P. Ranch in Alberta, for H.R.H. Prince of Wales, Selecting a Draught Stallion.	182
6. W. A. Dryden, Maple Shade, Brooklin, Ontario. Selecting a Shorthorn Bull.	184
7. His Honour J. D. McGregor, Lieut.-Governor of Manitoba, Selecting an Aberdeen-Angus Bull.	185
8. W. W. Boyd, Bobcaygeon, Ontario, Selecting a Hereford Herd Header.	187
9. R. M. Holtby, Port Perry, Ontario, Selecting a Holstein-Friesian Bull.	188
10. R. R. Ness, Howick, Quebec, Selecting an Ayrshire Bull.	190
11. Col. Bartley Bull, B.A., Brampton, Ontario, Selecting a Jersey Sire.	191
12. Dr. R. M. Jenkins, Don Alda Farms, Toronto, Ontario, Selecting a Guernsey Sire.	193
13. Col. Robert McEwen, London, Ontario, Selecting a Breeding Ram.	194
14. Geo. B. Rothwell, B.S.A., Dominion Animal Husbandman, Selecting a Bacon type Boar.	195
15. J. G. Taggart, B.S.A., Sup. Dominion Experimental Farm, Swift Current, Sask., The Uses of a Farm Tractor.	198
16. D. N. McIntyre, Meadows, Man., Experiences with a Combine Harvester.	206

LIST OF ILLUSTRATIONS

	PAGE
1. <i>Sittyton Grove.</i>	Frontispiece
2. <i>Cultivating by Horse Power.</i>	17
3. <i>Queen of Willowdale, Clydesdale Mare.</i>	19
4. <i>Home-made Plank Float.</i>	20
5. <i>School of Agriculture, Olds, Alberta.</i>	22
6. <i>Alberta Oat Crop.</i>	24
7. <i>Guernseys Grazing in Don Valley.</i>	26
8. <i>Cutting Sweet Clover, Kemptville Agricultural School.</i>	29
9. <i>Robert Gratz</i>	33
10. <i>Cattle at A7 Ranch, Lundbreak, Alberta.</i>	38
11. <i>Perennial Sow Thistle.</i>	40
12. <i>Couch Grass.</i>	44
13. <i>Tumbling Mustard.</i>	45
14. <i>Stink Weed.</i>	46
15. <i>Wild Oats.</i>	47
16. <i>Suffolk Sheep, W. A. Dryden.</i>	48
17. <i>Holstein-Friesian Cows, Mount Victoria Farms.</i>	49
18. <i>Yorkshire Sow, Dominion Experimental Farms.</i>	52
19. <i>Clydesdales, Dominion Exp. Farm, Indian Head.</i>	55
20. <i>A Prairie Wheatfield.</i>	58
21. <i>Laet, Percheron Stallion.</i>	61
22. <i>Revolution 7th, Aberdeen Angus Bull.</i>	64
23. <i>Belgian Horses in Saskatchewan.</i>	68
24. <i>Dr. Chas. E. Saunders.</i>	71
25. <i>Cutting Corn for Ensilage.</i>	76
26. <i>Sunflowers for Ensilage, Olds, Alberta.</i>	78
27. <i>Scantling Silo on Thos. McKercher's Farm, Olds, Alta.</i>	81
28. <i>Method of Building Scantling Silo.</i>	81
29. <i>Jersey Cow, Brampton Excellent Paxie.</i>	84
30. <i>Guernsey Cows at Royal Winter Fair.</i>	86
31. <i>Shorthorns at International, Jas. Douglas & Sons.</i>	88
32. <i>Hereford, Junior and Grand Champion, Mossom Boyd & Co.</i>	90
33. <i>Hereford Junior Champion Bull Calf, for Mossom Boyd & Co.</i>	91
34. <i>Sheep on Western Stock Ranch.</i>	95
35. <i>La Belle Mimosa, Dairy Shorthorn, Alexander Maclaren.</i>	97
36. <i>Jerseys in Pasture at Brampton.</i>	99
37. <i>Holstein Bull, Abbekerk Sylvius Lad, J. W. Innes</i>	101
38. <i>Judging Dairy Shorthorns at Royal Winter Fair</i>	103

39.	<i>Farm Power at Pasture.</i>	106
40.	<i>Junior Champion Hereford Heifer, Mossom Boyd & Co.</i>	107
41.	<i>Barred Rock Laying Pen.</i>	110
42.	<i>Andrew Anderson's Grounds.</i>	113
43.	<i>Light Sussex Laying Pen.</i>	114
44.	<i>Hen, a Bad Head (fat).</i>	115
45.	<i>Hen, a Good Head.</i>	116
46.	<i>Poultry Colony House.</i>	117
47.	<i>Hen, Bad Head (crow).</i>	117
48.	<i>Hen, Good Head, front view</i>	118
49.	<i>Turkeys, prize winners.</i>	119
50.	<i>Good playmates for farm boys, Shetlands.</i>	120
51.	<i>Clydesdales at Stirling, Scotland.</i>	121
52.	<i>Percherons owned by C. M. Rear, Regina, Sask.</i>	122
53.	<i>Monarch's Rose, Grand Champion Percheron Mare, Mrs. E. Wood.</i>	123
54.	<i>Craigie Ambition, Clydesdale Stallion.</i>	124
55.	<i>Monarch, Percheron Stallion.</i>	126
56.	<i>Major de Malmaison, Belgian Stallion.</i>	128
57.	<i>Snelston Topper, Shire Stallion.</i>	129
58.	<i>Shorthorns at Sesqui-Centennial, T. A. Russell.</i>	130
59.	<i>Edellyn Favorite, Grand Champion Shorthorn Bull, Col. F. H. Deacon.</i>	132
60.	<i>Willow Spring Gay Lass 414th, Grand Champion Here- ford, F. Collitut.</i>	134
61.	<i>Glencarnock Jessie 9th, Grand Champion Angus, J. D. McGregor.</i>	137
62.	<i>Thos. McMillan, M.P.</i>	139
63.	<i>Prize Winning Steers fitted by University of Alberta.</i>	140
64.	<i>Holstein Cow, Oakhurst Colantha Abbekerk, Owned by Mount Victoria Farms.</i>	143
65.	<i>Springburn Lady Beauty 2nd, Ayrshire Cow, Owned by Hon. F. C. Biggs.</i>	147
66.	<i>Brampton Bay Xenia, Jersey Cow, sold for \$8,000 by B. H. Bull & Sons.</i>	149
67.	<i>Lilyetta of Chicon, Guernsey Cow, owned by Don Alda Farms.</i>	152
68.	<i>S. G. Carlyle, Alberta Live Stock Commissioner.</i>	153
69.	<i>Judging Ayrshire Cows, Royal Winter Fair.</i>	154
70.	<i>Jersey Cow, Brampton Washington Beth, B. H. Bull & Sons.</i>	156
71.	<i>Miss Daisy, Grand Champion Dual Purpose Shorthorn, D. Z. Gibson.</i>	158

72.	Fairy Duke, Grand Champion Dual Purpose Shorthorn Bull, Alex. MacLaren.	159
73.	Grand Champion Southdowns, Col. Robt. McEwen & Sons.	162
74.	Champion Leicester Ram, Jas. Snell.	163
75.	Champion Oxford Ram, Estate R. J. Fleming.	164
76.	Champion Lincoln Ram, Herbert Lee.	165
77.	Dishley Merinos in France.	168
78.	Belgian Geldings in Antwerp.	169
79.	Berkshire group, E. Brien & Sons.	170
80.	Berkshire Boar, Grand Champion, E. Brien & Sons.	172
81.	Tamworth Hogs, Alberta Prairies.	174
82.	York Gilts, Manitoba Agricultural College.	175
83.	Self Feeder for Hogs, Construction.	178
84.	W. L. Carlyle, Manager E. P. Ranch.	183
85.	W. A. Dryden, Brooklin, Ontario.	184
86.	Thornham Minstrel, Grand Champion Shorthorn Bull, Duncan Campbell.	184
87.	His Honour J. D. McGregor, Lieut.-Gov. Manitoba.	185
88.	Blackcap Revolution Grand Champion Angus, J. D. McGregor.	186
89.	Campelion 7th Grand Champion Hereford, Mossom Boyd & Co.	187
90.	R. M. Holtby, Port Perry, Ontario.	189
91.	Johanna Rag Apple Pabst., Grand Champion Holstein-Friesian, Mount Victoria Farms.	189
92.	R. R. Ness, Howick, Quebec.	190
93.	Dunlop Radiance, Grand Champion Ayrshire Bull, W. W. Skinner.	191
94.	Col. Bartley Bull, B.A., Brampton, Ontario.	191
94.	Jersey Volunteer, B. H. Bull & Son.	192
95.	Dr. R. M. Jenkins, Superintendent Don Alda Farms	193
96.	DonAlda Mixter Radiant, Guernsey Bull, DonAlda Farms	193
97.	Col. Robt. McEwen, London, Ontario.	194
98.	Shropshire Ram.	195
99.	Geo. B. Rothwell, B.S.A., Ottawa.	195
100.	York Boar, J. E. Brethour & Nephews.	196
101.	Clydesdale Filly, Doune Lodge Princess, Mrs. W. H. Bryce	197
102.	J. G. Taggart, B.S.A., Experimental Farm, Swift Current, Sask.	198
103.	Farming with Tractors.	200
104.	D. N. McIntyre, Meadows, Man.	206
105.	Champion Highland Bull.	209

SOIL CULTIVATION

THE exact details of soil cultivation will vary almost as much as the soil itself. Moisture and climatic conditions must also enter into a farmer's calculations when deciding the treatment his land should have. Soil is cultivated for the purpose of putting it in the best possible condition to grow crops, therefore, the work must be done with a view to killing weeds, preparing a good seed bed, conserving moisture and keeping the land in good physical condition.

Structure and Texture There are two terms commonly used with reference to soil—"texture" and "structure." Texture refers to the size of the minute particles or grains of which the soil is made up. Thus the texture of some sandy or gravelly soils is quite coarse, while the texture of some soils of clay or silt is very fine. Structure refers to the manner in which these particles are arranged or clustered into lumps. It will be seen, therefore, that conditions of both the texture and the structure of the soil enter into the promotion of the growth of plants, but that cultivation affects only the structure of the soil. You can break up the lumps and improve its structural condition, but you cannot change its texture. However, you must consider the latter in planning your crops.

Keep Off Wet Lands Moisture is held in soils as a sort of film around the particles, and by means of this film of moisture the soil is held in lumps or crumbs. This is called capillary moisture, or capillary water, and is the only water that is available to plants to promote their growth. If clay land, composed of very fine particles, is cultivated when wet enough for the particles to float over each other, the result will be to pack the particles much closer together, or puddle them, and as the water evaporates, leave a brick-like surface which is very hard to work into good condition afterwards. This is the reason you should keep off clay lands while they are wet. In fact, the surface of all land should be dry before it is worked.

How Crops Grow Growing crops get all their moisture, as well as the mineral matter for plant food and also what nitrogen they require, from the soil through their roots. The leaves furnish a supply of carbon dioxide which they extract from the air by a system of "breathing"—the plant retains the carbon which furnishes substance to help to build it up and the oxygen is "breathed" into the air again.

The soil must also furnish warmth enough to promote growth. This it gets from the sun's rays. Air is also necessary for plant and bacterial life and must be admitted to the roots between the particles of soil. It is well, then, in cultivating land to keep in mind its functions in growing crops. It must have a supply of capillary water, plenty of available plant food and its "structure" must be such as to admit air to the roots of the plant, and yet conserve as largely as possible this invaluable supply of moisture.

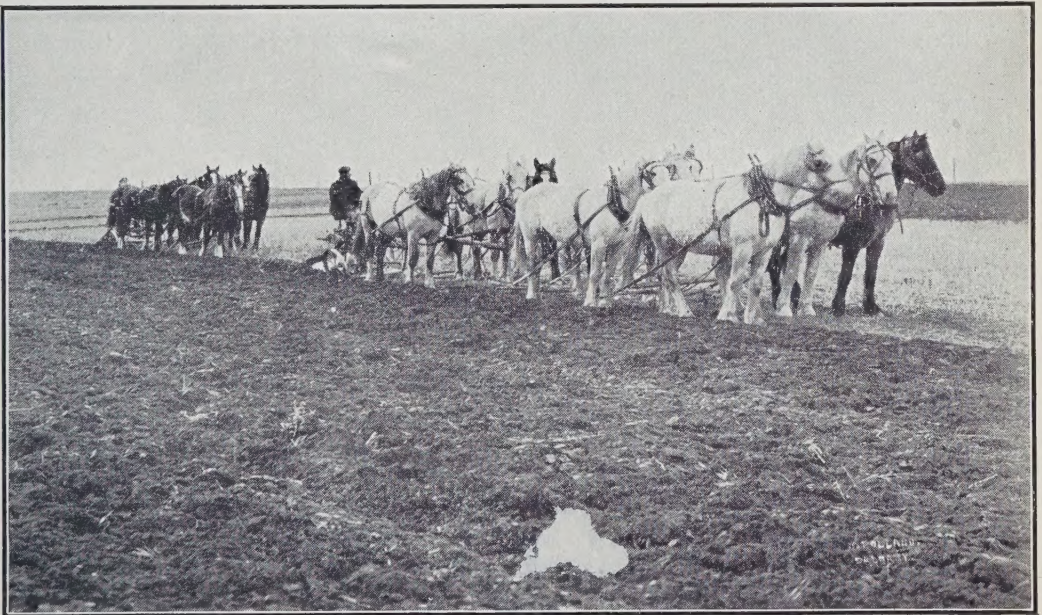
It will be observed that the roots supply, from the soil, all the plant nourishment, with the exception of carbon. In the case of leguminous plants, such as peas, Alfalfa and clovers, they secure a supply of nitrogen from the air through the operation of bacteria, common to them. They not only supply their plants with it, but store a further supply of nitrogen in the soil for the sustenance of future crops.

Drain Off Surplus Water Surface drainage is necessary to land because if water is allowed to lie on part of a field it runs the soil together, forming a hard surface and so preventing the admission of air. If land does not have a self-draining subsoil, especially in districts of heavy rainfall, it must be tile-drained to improve its ventilation and so make the capillary water more available to the crops. Otherwise the field will become waterlogged and the crop will make very uncertain progress.

The Valuable Moisture It will be seen, therefore, that when a heavy rain falls, the water that adheres to the particles of the soil is the important thing. Any surface surplus is better ^{run}ed off, and any surplus caught by a hard pan formation in the subsoil is better taken care of by tile drains. The nature of prairie soil is very favorable for self drainage and the farmers are not bothered with a surplus in the

subsoil. The problem on the prairies mostly is how to conserve the capillary water so as to get its full benefit.

Value of Humus To have your land in the best condition, it should contain a liberal supply of "humus" (partially decayed vegetable matter). The presence of humus in the soil keeps it open enough to admit of a circulation of air to the plant roots, and because of its sponge-like consistency, makes one of the best mediums for retaining moisture for plant nourishment. It also adds to the warmth of the land and so makes ideal conditions for growth. The importance of plowing down heavy stubble, a green crop, or barnyard manure is thus emphasized, as, if the supply of humus is not kept up it is impossible to get land in a good condition of tilth, which means in good heart, or in a favorable condition to promote vegetation. The soil must also provide anchorage for the roots of growing crops, and if it lacks in the fibre, which humus provides, it is apt to drift and the crop will lose root and to some extent blow out.

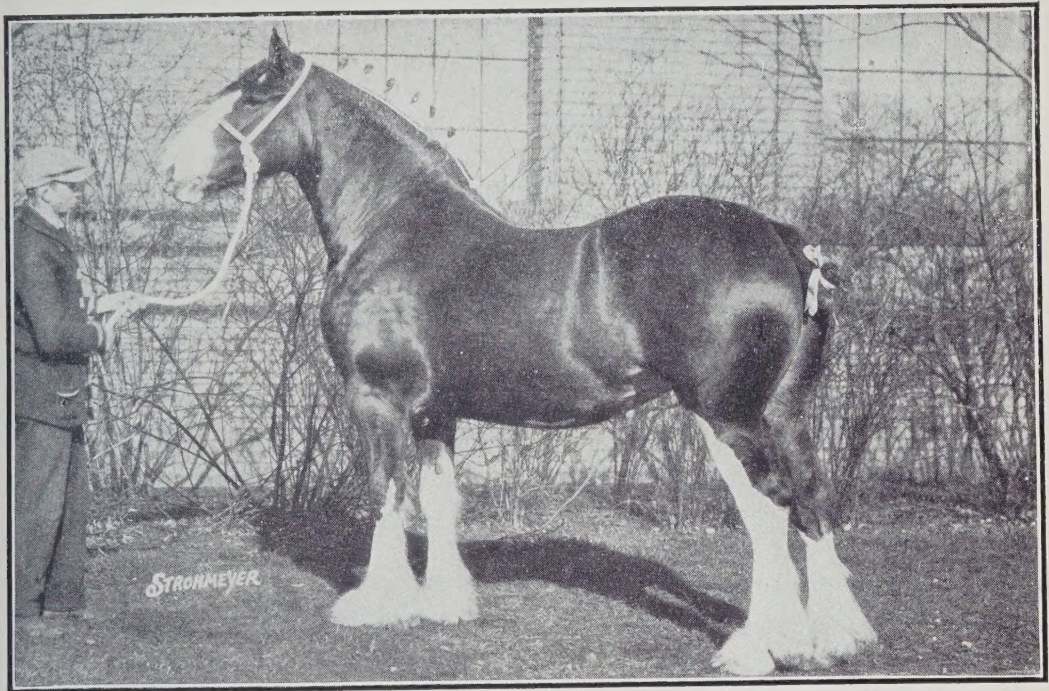


Cultivating by horsepower in Western Canada

Fall Plowing For Spring crops, Fall plowing is generally found to be the most satisfactory—though there are always exceptions which make farming so much a business of experience. If you have a good depth of top soil, it is well to plow deep in the Fall. In this way you bring up fresh soil and loosen the land to store moisture to a greater depth. It is usually a good plan to leave the plowed field without further cultivation in the Autumn and Winter, as late rains and snow will add more to its moisture content if the furrows are not harrowed down, and the frost will pulverize it so that a harrowing in the Spring will break it up easily. If the land is to be seeded to wheat, Fall plowing means earlier seeding which is very essential. In Ontario, where the harvest is earlier, the best plan is to plow shallow with a gang, or cultivate with a broad share cultivator immediately the crop is off. If favored with a shower, this should bring the weeds on—then plow deeply and you have cleaned and improved your land for next year's crop.

Spring Plowing If the land is not plowed until Spring, it is best not to plow too deeply. Shallow plowing and surface cultivation will lose you less moisture and produce better results in the Spring. In fact, some prairie farmers find that if the land is not plowed in the Fall, after the first crop of wheat on Summer fallow, stubbling in the second crop is a good plan. There is no loss of moisture and the results are often quite good. Burning stubble, of course, is wasteful and sowing without plowing is encouraging weeds, so that these plans will not likely profit you in the end, though strong prairie land will stand a good deal.

Stubbling in on corn land that has been well cultivated during the past summer is quite another thing, and is a good farming practice. When you plow in the Spring, put on an extra horse, if necessary, but be sure to drag a section of spike tooth harrow after your plow to break the "structure" of your land down fine so it will store more moisture in case of rain, and allow less of what it already has to evaporate.



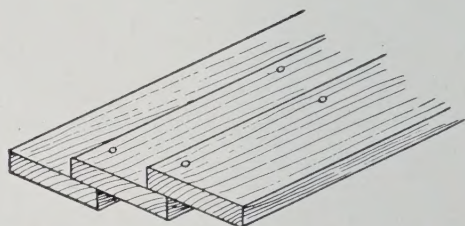
*Queen of Willowdale, senior champion Clydesdale mare,
Royal Winter Fair 1928 for Don Alda Farms*

Spring Cultivation When you break the surface with Spring cultivation, you should have the land worked down fine as rapidly as possible, so as to lose the least possible amount of the stored moisture. If you have a large area to cover, it is important to have large implements. Drag harrows can be made almost any width and a tractor or eight or ten horses should be hitched to get over the surface as quickly as possible. Time counts after the surface is dry, as the sooner you break the crust the better the condition of your land will be for starting a crop.

It is important that grain shall sprout immediately after seeding and that it may get a firm root-hold in the soil. To get these results, you must have your land mellow and moist. It must not be lumpy or you will lose moisture through evaporation and your crop will dry out—therefore extra cultivation should be given to break down or pulverize lumps.

Stiff Clay Land Stiff clay land may require a good deal of attention in the making of a seed bed. Of course no good farmer tries to plow clay of this kind when it is wet, nor in fact does he try to work it at all then. In Ontario some clay fields require very special attention. A land packer or roller, or a rotary hoe machine will help to break up these lumps. But if you have not got one of these machines, a home-made one can easily be constructed by spiking together three two-inch planks, after this fashion:—

Hitch your horses to this “float,” drawing it over the land. If the planks are a foot wide and about 14 feet long, they will do good work. If not heavy enough to break the lumps, load the “float” with large stones or heavy pieces of metal.



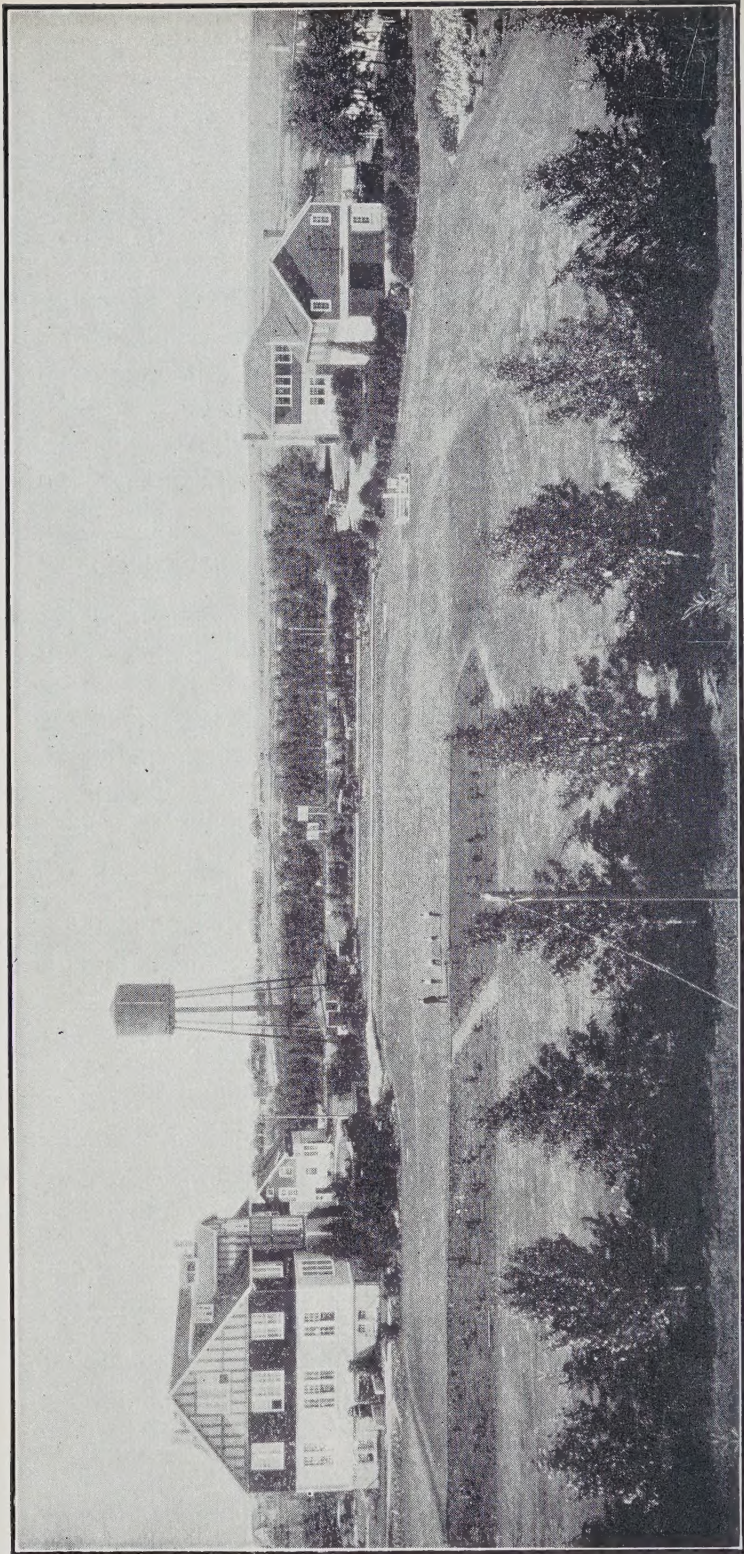
Home-made Plank Float

Make a Good Seed Bed It may be possible to overwork land, but that would only be the case in worn-out soil that was at the drifting stage. Land in any sort of good heart needs to be well cultivated and one of the best implements for this purpose is the spike tooth harrow. This implement is never worked enough. Every time you harrow a field you not only pulverize the soil, but you firm it as well, and the purpose for which you use land packers and rollers can mostly be performed with the harrow if you can take the time. If you use a smooth roller, be sure to follow it with the harrow, as it will leave your soil in better condition, as to air and moisture content, to promote plant growth.

Conserve Moisture The “texture” of your land determines the amount of labor necessary to get its “structure” in a condition most favorable to the growth of crops. You cannot alter the texture, but you can control the structure and so greatly influence results. The matter of moisture and tilth cannot be too much emphasized.

Farming in Western Canada teaches one very quickly the value and importance of conserving moisture. To fail to do so is disastrous. In Ontario, frequent rains relieve the farmer of the necessity of some of the watchfulness in this, but where Summer cultivation is done, or in plowing for Fall wheat, a great deal can be gained by following each day's plowing with the disc or harrow and getting the surface fined down so the moisture will not be lost. It is bad to let the land "dry out" by leaving it lumpy, as even though it rains soon you have lost a good deal in getting a start for your crop. Even if you are a one-team farmer, harrow next morning what you have plowed today, and you will find it profitable.

Cultivate When your crop is well covering the ground,
Growing Crop don't be afraid to harrow it. If there has been a heavy rain and a crust formed on the surface of the field, harrow it. Don't worry if the crop is six inches high, you won't hurt it; but rather will help it greatly, and you will kill weeds that have come up. Surface cultivation is the greatest possible help to a crop at this time. Harrow your Fall wheat in the Spring as soon as the surface dries enough for the implement to work without clogging. It will give the wheat a fresh start, let air into the soil and prevent moisture from escaping by thus forming a dust blanket over the stored water in the soil. Regular surface cultivation, when the surface of the land is dry, of all growing crops until they are eight to ten inches high, will pay splendid dividends to the farmer who performs it.



School of Agriculture at Olds, Alberta, one of a system of Schools of Agriculture, established by the government of that province

*Chapter II***SEED SELECTION**

A FARMER may have a crop that fails to measure up to what it should be and the reasons may be many and varied. He might not have the power or help to properly cultivate. The weather might be very unfavorable. Hail or blight of some kind might destroy it and he would not be to blame, but when a man has a crop failure because he sowed bad seed, he alone is to blame, and the result can scarcely be excused. If he has to sell his own inferior grain for feed, the additional cost of good seed is only trifling compared with the loss he is deliberately arranging for when he plants poor seed grain.

Seeds are the means of propagating plant life. To accomplish this they have to grow into plants, consequently the seeds that will grow most vigorously are the best to plant.

How Seeds Grow Seeds have four elements, the covering to protect them, the germ which is a miniature plant, about it a covering of plant food to nourish the germ when it sprouts, and about the plant food a ferment which, when the seed is brought into contact with moisture, heat and air, dissolves the plant food—making it available to the germ or embryo, causing the latter to sprout and grow.

It is now quite apparent why “plump” grain is advisable for seeding. In these well developed kernels you have a better supply of plant food, the germ gets a better and more vigorous start, and it is a better and hardier plant. Your first consideration, of course, is that you must have live germs in your seed.

Test for Germination The only method of discovering this is by testing your seed for germination. This may be done for you at a government seed testing station, or you may do it for yourself in a box of earth in your home during the winter. If you do your own testing, be sure you take an average sample, as you count the grains you are planting don't pick them over to get the best and plumpest.

You can test the percentage of germination this way and you can also see if the average growth is vigorous enough to suit

you. If your germination percentage is high, but the stalks are not all vigorous in their growth, then run your seed through the fanning mill again and fan out more of the lighter, smaller seeds.

Clean The Seed There are two qualities one must have in good seed —vitality and purity. One will get weeds on his farm quickly enough without planting them. When you sow weed seeds you are following a definite method of self destruction as a farmer. Weeds are too expensive a crop to be tolerated, and planting them is the most deliberate kind of folly.

The liberal use of the fanning mill in cleaning and re-cleaning your seed grain is time well and profitably spent. This is a process by which you improve both the vitality and purity of your seed at the one performance. You can fan out the light and immature grains that would produce weak plants and you re-



An Alberta oat crop

move the weed seeds that in their growth would choke out your grain, rob your soil, and propagate their species to the ruination of your farm.

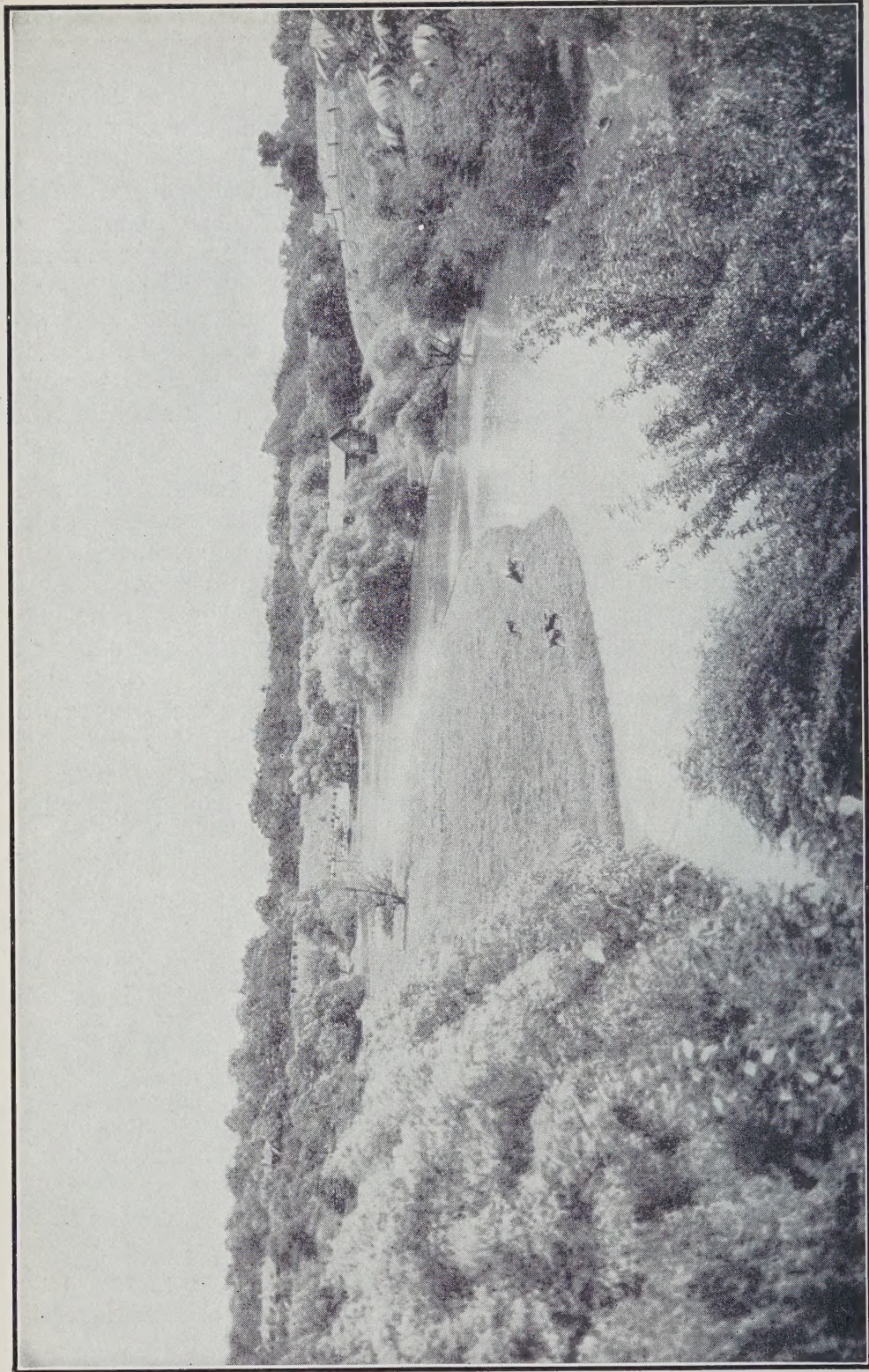
The fanning mill is an indispensable farm implement. Any effort to farm without one will bring you grief in abundance. Start cleaning your Spring seed early in the Winter, there is never time to do it in the Spring, and if left until then is likely to be only half done. It is one of the most important pieces of work you have to do on the farm and deserves to be done well. This is one means of improving crops over which the farmer has complete control and he should exercise it wisely. Sow nothing but good clean seed.

Seed Grain Should Be Treated All seed grain should be treated before it is sown. Smut has become so prevalent all over Canada that while you may not be much troubled with it this year, you cannot be certain about escaping it the next. Seed can be treated with formalin or blue stone, but the formalin treatment is the most effective for all kinds of grain.

There are several machines on the market for treating grain, and no doubt they work very satisfactorily but this is only a few hours work once a year and can be done so easily without a machine that it seems a pity to have to store a machine for the remainder of the year.

Four ounces of formalin should be stirred into ten gallons of water and the grain dampened with this solution. A wagon box, an empty grain bin, or a cleaned part of the barn floor is a good place for treating. Shovel over your grain and dampen it well with the mixture, using a watering can so as to sprinkle it evenly over the grain without wetting it too much. When the quantity you are treating is all dampened, throw a blanket or two over the pile or bag it up ready to be taken to the field.

A good plan is to treat it in the wagon box and then cover it and drive the wagon to the field where you are sowing. Grain should be sown the day it is treated, or the following day. It is sometimes spread out to dry after it has been covered for a few hours, but this is hardly necessary. If it is swollen from the moisture, open your drill to sow the desired quantity per acre, and if the grain is a trifle damp it will sprout all the earlier.



Guernseys grazing in the Don Valley

*Chapter III***SUMMER FALLOWING**

THE Summer fallow has gone out of fashion in Ontario for some years now. The growing of corn for ensilage has been used as a means of cleaning the land as the corn can be cultivated so as to destroy a good many weeds. The result is that farmers argue it to be a great waste to let land lie out of a crop for a year. This may be true under some conditions but it is a much greater waste to have it producing only half a crop for several years, while the work and seed for a full crop have been annually expended upon it.

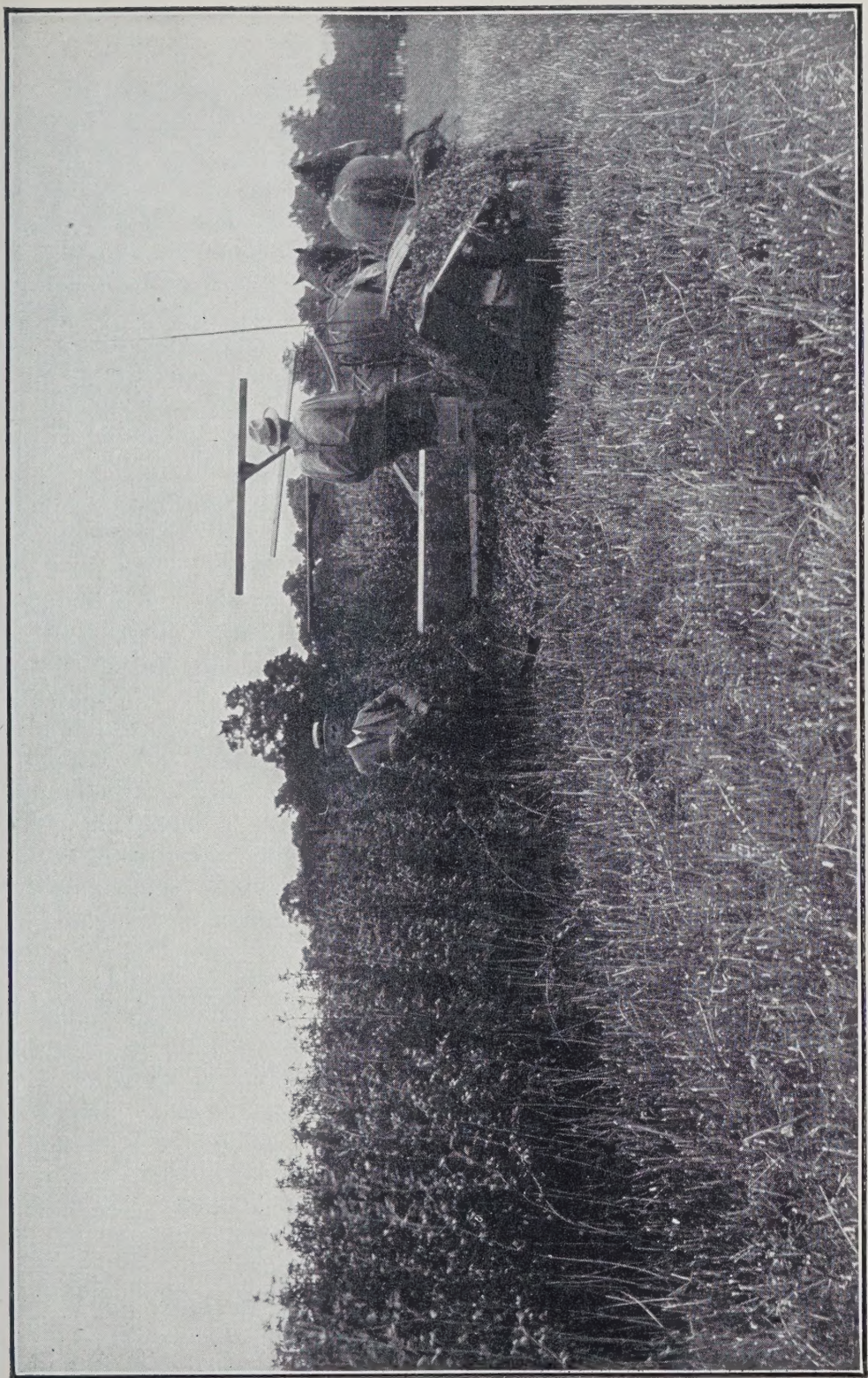
To Kill Weeds The progress made by weeds in recent years has rendered Summer fallowing almost obligatory in many cases. Without leaving the land idle for a whole summer it seems well nigh impossible to apply cultivation enough to eradicate weeds that have taken possession of a field. Growing weeds sap both the moisture and vitality of the land and when a field requires special treatment to clear it of weeds it generally requires some restoration of fertility as well.

Sweet Clover for Fertilization A good plan is to select the field to be Summer fallowed a year ahead and seed it to Sweet Clover, sowing the clover with the grain crop and using about twenty pounds to the acre. Don't be afraid of seeding it too heavily, be sure to sow enough to get a good stand to plow under. Let the clover get well up, but plow it just before the first flowers open as the stems must not be allowed to get brown or woody at the bottom before turning under, or they will not decay so readily. Use a chain from the beam of your plow to turn the clover completely into the open furrow. When plowing Sweet Clover under on a Summer fallow, put an extra horse in your team and draw a section of diamond harrow after the plow. If it is wide enough to overlap and give the ground a double stroke of the harrow so much the better. Harrowing at once closes up your surface, preventing evaporation of moisture, and also aiding the rapid decomposition of the clover plowed under.

Restores Nitrogen and Humus Sweet Clover is rich in nitrogen and you can greatly revive the strength of your soil with a supply, in this way, of one of the constituents most essential to the growth of crops. With a good heavy crop of Sweet Clover you are also adding humus to the soil, another essential. Humus, or partially decayed vegetable matter, as before described, serves a variety of purposes in improving land. It absorbs and holds moisture, and makes the land easier to work as it prevents the formation of large clods and helps to break up the clay. It also keeps the particles of soil apart enough to let air in, which is essential to the growth of seed and the development of roots.

Improves Soil in Other Ways When you plow down a heavy crop of Sweet Clover the acid developed by the decomposition of this vegetable matter helps to dissolve some of the mineral matter in the soil thus making it available for plant food. It is well known that a simple analysis of soil will not determine its value for growing crops, as you must have conditions which will make available to the plants the potash, nitrates, phosphorus, calcium, iron, magnesium, sulphur, etc., which aid in plant growth. The dark color of soils is due largely to the humus that is in them. It is well known that dark colors absorb the rays of the sun to a greater extent than light colors, consequently a dark soil is bound to be a warmer soil. Thus, if warmth, air and moisture are three things essential to the sprouting and growth of seed you will realize what an important part humus plays in soil composition.

How Nitrogen Made Available Nitrogen, one of the essentials to vegetable growth, is only available for plant food when combined with other elements. Growing crops have no power to avail themselves of the nitrogen in the air. Leguminous plants, like Sweet Clover, have a bacteria which live in "nodules" on their rootlets. These nodules contain bacteria which extract the nitrogen from the air. Just how they extract this nitrogen is, as the late Joseph E. Wing said, as obscure as the nature of electricity. These bacteria are continually reproducing, growing and dying, and thus giving up to the soil and plant their nitrogen. The nodules on the rootlets of



Cutting Sweet Clover for the silo at the Kemptville, Ont., Agricultural School

Sweet Clover contain a large supply of nitrogen in a form made available by the bacteria to soil and plants.

It will be seen, therefore, that by plowing in a heavy crop of Sweet Clover you supply the soil with nitrogen to strengthen it and with humus to hold its moisture. You make it easier to till, give the plant roots more air and warm your land, and produce acid formed in the decomposition to dissolve mineral substances in the soil and make them available to the growing plants. Sweet Clover is perhaps the best available plant for this purpose as it will make a fairly vigorous growth on soils low in fertility. Its capacity for contributing nitrogen to the soil is unrivalled by any other legume, and it adds to the soil a large amount of green manure.

If your land then had a light treatment with potash to stiffen the straw and phosphoric acid to aid in the growth of the grain you should be in the way of growing a crop that would prove a really profitable one.

Keep It A Summer fallow should be kept **black** all summer.
Cultivated Frequent harrowing is the best cultivation. As soon as the weeds show green at all, harrow it.

If because of a wet spell, or rush of work, the weeds get ahead of you, the best implement is a duck foot or broad share cultivator, and be sure to sharpen the blades of the shares. The idea that a dull hoe cuts cleaner than a sharp one has been exploded long ago. Have the cultivator feet sharp so as to cut everything off clean, and have them broad enough in the blades and so set as to cut the entire surface. The cultivator should not be run too deeply, just enough to clean everything out. Let the surface dry and the weeds on top wilt, and then harrow to tear out the rest, and keep harrowing at intervals to clean the whole mess out.

Rod and cable weeders are used in Western Canada with excellent effect and have proven good weed destroyers. Mr. C. S. Noble, of Nobleford, Alberta, can claim the honor of inventing and using the first rod weeder. His machine was a very simple affair. Just an axle and two wheels, with pieces of iron down from the axle, and a half-inch iron rod run through the bottom end of them, set low enough for the rod to be an inch or two below the surface of the ground, and when the machine was drawn over

a field this rod cut off the weeds just below the surface. Rod weeders are now built with a square rod geared to revolve as the machine is drawn, and they are a most effective method of clearing out newly sprouted weeds, the revolving rod pulling them out by the roots.

The surface of the Summer fallow must be kept well cultivated. If hot weather, following rains, forms a crust, break it up with the harrow as soon as the surface is dry enough, and you will prevent loss of moisture, and let the air into the land to promote a further growth of weeds which you can kill by additional cultivation.

It Pays to Miss One Crop Missing one crop to clean a field and increase its fertility will always pay. It takes as much labor and grain to seed a field low in fertility, and infested with weeds, from which you will get a poor and unprofitable return, as it does to seed a field from which you have a right to expect a full and profitable yield. Every year you allow a field in bad condition to increase its weeds and lose in fertility, is a year lost, or what is worse, wasted. Steady improvement in our farming operations should form the basis of our future plans.

Once a farm is free from weeds and the soil brought into good heart, it can be kept in that condition by a carefully planned rotation of crops that may eliminate entirely the necessity for Summer fallowing, except where large areas are farmed for wheat or where a scarcity of moisture may make it advisable to save the most of two year's rainfall for one crop. In this connection it is well to keep in mind the value of live stock on the farm, as there is nothing so valuable in restoring fertility to the land as a liberal supply of barn yard manure.

On the Prairies Where wheat farming is carried on extensively the Summer fallow is indispensable. How often the land should be treated this way must be determined by your soil conditions, average annual rainfall and the prevalence of weeds.

If land becomes infested with weeds it should be Summer fallowed at once. Delays are dangerous under such circumstances

and the sooner the job of cleaning them out is tackled the better, and if they have got a real hold on the land nothing but a well cultivated Summer fallow will accomplish very much.

In districts where the rainfall is light, wheat land should be Summer fallowed after every two crops, and in some localities farmers have found it advantageous to Summer fallow after each crop, and so have just one half their land under wheat each year. However, the nature of your soil and amount of moisture will govern this. It has frequently been found that a crop of barley did well after wheat on a Summer fallow and then wheat might follow the barley with good results, thus giving three crops between each Summer fallowing of the land.

In black loam districts it is not so necessary to Summer fallow often, but killing weeds is rather difficult to accomplish without Summer tillage. Harvest is generally too late to get the weeds to sprout in the Fall after the crop is off and the land cultivated. This is an advantage that Ontario has in the fighting of weeds.

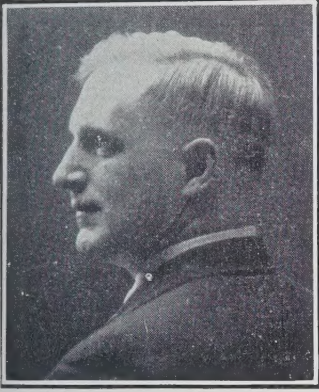
Wheat then Mr. S. Melville Webb, manager for Hon. E. G.
Fallow Strutt, of the Big 4 Farms at Flaxcombe, Sask., where 10,240 acres are farmed wholly for the production of wheat, follows the plan of alternating wheat and Summer fallow. This farm is between Kindersley and Alsask, and is in a district where the conservation of moisture is the great problem. About half the work on this farm is done by horses and the balance by tractors. Of recent years Mr. Webb has been growing green oats for horse feed in strips on his Summer fallow. The result is a rather lower yield of wheat the following year, but he regards the production of the feed and having it on the farm as full compensation for this.

Mr. Webb is thoroughly convinced that the plan of Summer fallowing every other year is the best for his district, being the only way to keep wheat crops up to a standard and weeds down to a minimum. His plan is to keep the Summer fallow "black." In 1927 the wheat crop averaged 28 bushels per acre, and in 1928 some 4,300 acres averaged 30 bushels per acre.

Dry Farming Methods

Farming in prairie districts where the rainfall is limited requires great skill in soil cultivation.

We secured the following article from Robert Gratz, of Nobleford, Alberta. Mr. Gratz is a graduate of the Olds School of Agriculture, and also attended the College of Agriculture in the University of Alberta for three years. He was employed by Mr. C. S. Noble as a farm hand, and later as foreman for some six years.



ROBERT GRATZ

In 1926 Mr. Gratz began farming for himself and now has 1,120 acres under cultivation. In discussing farming in the dry areas Mr. Gratz writes:

“Our soil having for centuries been built up from the decay of plant growth, is very rich in soil nitrogen and basic elements essential for production of hard wheat. Our success depends primarily upon how intelligently we apply ourselves to our particular problems. Our wide expanse of prairie land, exhilarating climate, and embracing atmosphere, are perhaps the reasons for an overwhelming optimism which causes a goodly number of us ‘to take a long shot,’ which is really not good business, much less good farm practice.

“The basic principle of dry farming is the careful, diligent, and persistent conservation of soil moisture during the growing season. Storing that moisture by a Summer fallow for the next year. It is always essential to success to have an intelligent insight into why we do this and that. Heretofore it was thought that anybody could farm whether he was really clever or not. There is no field of endeavor where it is more necessary to have a very clear and definite understanding of underlying principles, good business ability, and industrious application of the same.

“Our farm population is composed to a certain extent of people who were not heretofore farm folk. The desire for independence and a home, was often the motive for settlement on our prairie land. To a large extent they have been successful in attaining their desires. However, it is a regrettable

truth that many have been victims of circumstance over which they had no control.

“How and when to Summer fallow should be clearly understood and industriously applied. By thoroughly double discing early in April the land to be Summer fallowed, we do two things, conserve moisture and start germination of weed seeds. It is often considered desirable to wait until growth starts before discing, but it is better farm practice to start as soon as the surface is dry.

“Keeping the fallow black at all times during the growing season is absolutely essential to a successful Summer fallow for the following reasons, to conserve moisture to the greatest possible degree at all times, to prevent the growth of weeds of all kinds, both noxious and harmless, and to create a healthy and vigorous environment for soil organisms and bacteria of all kinds. It is well known that frequent tillage promotes nitrogen fixation and helpful physical actions and reactions.

“There is a great difference of opinion as to which method of Summer fallow gives the best results. Some of us are still boosters of the mould board plow. Under some conditions undoubtedly plowing is the cheapest and best. However, it is generally recognized that the plowless fallow often gets larger and better wheat yields.

“There is an ever increasing assortment of tillage tools available. Our manufacturers are doing everything in their power to help us with our problems, and will at all times supply any particular tool we would like to have. During the last five years we have seen a great increase in power farming. Whether right or wrong, it has made it easier for us to keep ahead of our farm work. There are so many times when it is necessary to ‘step on it’ to keep weeds under control, to get baking stopped, and thus prevent de-nitrification and loss of soil moisture by surface evaporation.

“While there are a good many farmers who maintain that it is a waste of time to fallow too early, at least before the first or middle of June, still it has been proven quite often that the early fallow brings home the bacon.

“After light discing two or three times before the first of June, the deeper cultivation should follow for several reasons. Our greatest rainfall is generally in June, hence the advisability

of creating a storage reservoir preferably before the rainfall. We can get our desired depth in many and various ways. It can be plowed, but this has two serious disadvantages. Any weed seeds which have not germinated to date will be turned in and have to be again brought to the surface before they can be eradicated. "Noxious seeds of an oily nature will not germinate, and to eradicate Stink Weeds, Mustards, and Wild Oats, plowing is undesirable for this reason.

"Secondly, continuous plow fallowing creates a plow sole, which is very undesirable and quite detrimental to capillary action.

"Another common method of Summer fallowing is by the duck foot cultivator. Going over the fallow twice should be sufficient. This method has the following desirable advantages. The soil is not turned in, the sterile inch or two on top is kept on top, all weed seeds are kept on the surface where they germinate readily. Cultivating twice costs less than plowing once, and going over the fallow twice should kill more weeds.

"This method is being used in Montana and Alberta with excellent results, a yield of from four to six bushels per acre more being harvested over the plow method, the cost of a cultivated Summer fallow varies, the plow method is a little greater. Cultivated fallow helps to a certain extent in the control of soil blowing.

"Tillage after cultivating can be done in a good many ways, depending on conditions peculiar to the situation. A down-pour of rain would in some soil require a quick stroke with the spring tooth to loosen up any baking and let the air in, a badly polluted soil would require the use of the rod weeder to kill the weeds. The rotary rod weeder is an implement which could be used a great deal more under varying conditions. It is very efficient in killing weeds of all kinds and does not pulverize but has a tendency to bring the small lumps to the surface.

"The growing season for weeds is fairly well over by the latter part of July. As a precaution against cut and wire worm infection, it is best not to disturb fallow during August. While I do not think there is any advantage in Fall cultivation, there are a few farmers who do duck foot cultivation after harvest as a safeguard against Fall and Winter soil blowing.

"After twenty to twenty-five years of wheat growing, soil fibre decreases to a noticeable extent. Such a condition is prim-

arily the cause of soil drifting. Soil drifting in the Lethbridge area is a very serious condition. In 1920 and 1926 it caused a great loss, thousands of acres were completely blown out, in some cases re-seeding was necessary two or three times. This blowing generally takes place in May.

"A great many methods of control were tried. So far the only successful one has been the 'alternate strip' one. It is a purely mechanical method of control. By seeding in from thirteen to twenty rod strips North and South, damage from blowing can be pretty nearly eliminated.

"This method is at best only a temporary one and is basically not good farm practice. It does not in any way put back fibre which is really the only cure for such soil condition.

"The growing of a biennial Sweet Clover is being tried to a very small extent. It has not become general as yet but is a step in the right direction. The seeding of from fifteen to twenty lbs. as a nurse crop with Spring wheat is the method used, the clover does not get to a height of more than fourteen to sixteen inches by harvest time. The following Spring it is allowed to grow until the early part of June. It can then be thoroughly worked into soil by discing, and plowed down as a cover crop.

"This has the advantage of a good green manure crop. It increases living fibre content. However, such a fallow does not resist drought as readily in the event of a really dry year.

"Another method of blow control worthy of mention is the growing of Winter wheat. C.S. Noble, who perhaps has done more for agriculture in Southern Alberta than any other one man, has in the last five years successfully grown Fall wheat on his large holdings at Nobleford. M. 22 Kharkof is a hardy strain of Winter wheat developed at MacDonald College. It has been grown with fair success at Dominion Experimental Stations for ten years. This wheat resists Winter killing most successfully especially when grown under the furrow method.

"The furrow method consists of a small trench from four to six inches deep. A drill with hoes nine or twelve inches apart makes the trench or furrow. The seed is dropped on the firm surface at the bottom of the furrow. Here it enjoys the greatest possible protection against Winter killing.

"Mr. Noble has also invented 'The Noble Packer,' for use

behind the hoe drill. This packer presses the seed firmly into the soil, insuring quick and even germination. Winter wheat is seeded during August and the early part of September and should cover the ground by the middle of October. Thus acting as a check to our Winter and Spring blow periods.

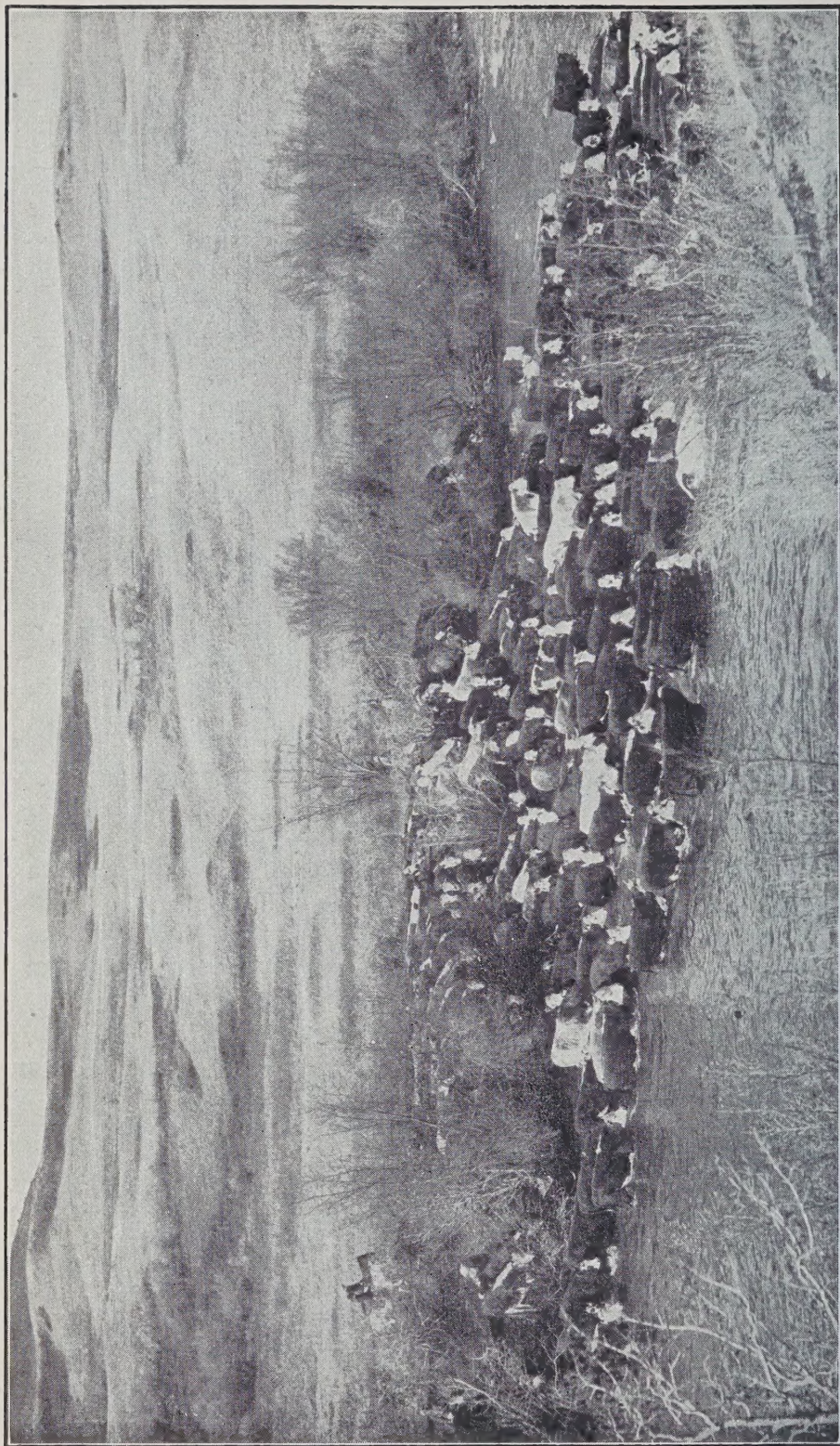
"Whether Winter wheat growing will become general in Southern Alberta remains to be seen. It has advantages which cannot be overlooked. The outstanding benefits are, that it divides the risk with Spring wheat, and also spreads the farm work over a greater period. It also has an advantage in that it is early enough in ripening to escape rust and frost.

"While it is of paramount importance to farm in the most approved manner, it is of equal importance to cut production costs in every possible way. Our cost of harvesting before the coming of the combine-harvester was from eighteen to twenty-five cents per bushel depending on yield, labor and harvest weather. With the use of the combine the cost of harvesting can be reduced to a total cost of from five to ten cents per bushel.

"Since the Great War, farm labor conditions have become more difficult, due to conditions over which we have no control. For this one reason alone the introduction of the combine-harvester has been a great relief.

"The use of the combine with swather or wind sower insures a maximum protection against shelling from wind. Swathing should be done when wheat is ready to cut with the binder. About ten days after swathing, picking up and threshing can commence. Under ordinary conditions, a large harvester will thresh from 1,200 to 1,800 bushels a day, picking it up out of the swath.

"The Western farmer is coming into his own as never before. The price of wheat has been fairly good during the last five years. The cost of production has been very materially reduced, resulting in greater remuneration for his efforts. This has made it possible for farmers to enjoy more of the comforts and pleasures of life. There is no field of endeavor which offers a greater opportunity to the young man of to-day, than the land of our Canadian West."



Copyright Photo by W. J. Oliver, Calgary, Alberta
Cattle crossing the Old Man River on the A7 Ranch near Lundbreck,
Alberta, owned by A. E. Cross of Calgary

Chapter IV

WEEDS

THERE are few larger losses from which farming suffers than that from weeds. They rob the soil of plant food and moisture that should be employed in growing useful crops. They crowd out grain crops and thus reduce the yield. They increase the cost of harvesting and threshing by adding to the bulk of the crop. They increase the cost of cultivation to keep them in check. They are robbers of the farmer's time and his soil's fertility and there should be no delay in putting forth efforts to eradicate them.

Classification There are different methods of classifying weeds, but for our purpose here, in a brief treatment of the subject, we might divide them into perennials, biennials and annuals. Each requires different treatment in some respect and naturally the first mentioned are the most difficult to fight.

Perennials Among the perennials are Perennial Sow Thistle, Canada Thistle, Couch Grass, Wild Carrot, Bladder Campion, Chicory, Oxeye Daisy, Catchfly, Buckhorn, Blue Lettuce, Poverty-weed and Bindweed. The first three are the most dangerous as they are propagated by very vigorous underground stems or running root stalks, as well as by their seed. The root stalks run along under the surface of the ground and send up new shoots in almost all directions. Any piece of the root with a joint in it that is imbedded in the soil will grow, hence the difficulty in killing them. They often appear in patches at first, but if allowed to go on undisturbed will soon spread all over a field. The other weeds in this list are generally classed as bunch perennials and are somewhat easier handled, with perhaps, the exception of Bindweed, Canadian Thistle and Couch Grass which all cling very tenaciously to the soil.

Build Up the Soil Weeds are frequently found on badly tilled, worn out land. If a farmer continues to crop his land and exhaust the soil without returning any fertility

to it, he may be sure that weeds will take possession of it. Weeds will grow on poor land, crops do not grow so readily on exhausted fields, and so the weeds get ahead of the crop and choke it out. The first thing to do in forming a plan for the eradication of weeds on your farm, if the soil is in a run down condition, is to build it up. This is perhaps more applicable to Ontario than the Prairies, as much of the strong prairie land doesn't lack in fertility even after persistent cropping. A crop of Sweet Clover plowed in to add fibre and nitrogen and an application of superphosphate to stimulate rapid growth and early ripening, however, might be good treatment for prairie land after successive cropping with wheat.

Smother crops are valuable in killing weeds, as we point out later in this article, but you must have fertility to grow a smother crop thick enough and vigorous enough to completely swamp the weeds. As a matter of fact, weeds do not grow much more vigorously on rich land than on poor land, so fertilizing the land means stimulating the crops to crowd the weeds out.

Methods of Destruction There are several methods of eradicating weeds; by hand pulling or digging; by cultivation; by using a smother crop; and by pasturing sheep on them. We would regard the sheep treatment as supplementary to the others, but by no means the least useful.

Perennial Sow Thistle If a patch or two of Sow Thistle appears on a farm, it should be "isolated" at once. This vicious weed should be quarantined as you would smallpox. Plow around it in cultivating the field, leaving it as an island. If you plow right through it, you cannot be sure how



Perennial Sow Thistle
(Courtesy, Seed Branch, Dominion
Dept. of Agriculture)

far the plow coulter will carry pieces of the root stalk and so spread the infection.

Then plow this patch, by itself, cultivate it and plant potatoes or turnips in this piece of land. You may lose the use of some parts of the field in this way, but that is a simple loss compared with what you will suffer if this vicious weed spreads. Make liberal use of your hoe among the potatoes or turnips and you can kill out the "infection" and save your field. If the patch is very small, dig the thistles out with a spade and remove all the roots.

To Clean Whole Fields If Perennial Sow Thistle has spread over a whole field and has made considerable headway, the best plan is to Summer fallow and use smother crops to help you. One plan is to sow a grain crop and seed at the same time with Sweet Clover, using at least 20 lbs. of clover seed to the acre, so as to keep the weeds in check in the grain, as a good stand of Sweet Clover will partially smother them. In June of the following year, plow the field, turning under the clover, and harrow twice immediately after plowing. Turning under this clover crop will enrich your land and put it in much better condition for the next crop. As soon as the weeds come up a good plan is to use a duck foot or broad share cultivator.

Have **wide** blades and have them **sharp**. Cultivate just under the surface, harrow well, and use the cultivator again when the weeds show, then about the middle of July, if you are farming in Ontario, sow about one bushel of buck-wheat to the acre. This will give you a good yield of excellent hog and poultry feed and will smother most of the weeds out.

Use your broad share cultivator immediately the buckwheat is harvested, and then harrow the ground. Give the weeds a chance to start if any are left, then plow for next year's crop. Seed to oats or a crop of mixed grain the following Spring, and when the crop is well up sow about 10 lbs. to the acre of broad leaf English rape. This can be done with a hand grass seed sower, and then harrow the field. This harrowing will kill weeds, cover the rape seed, and bring on the grain crop. Immediately after the grain is harvested, the air and sunlight will get into the rape plants, and they will spring up, covering the whole surface

of the field with their broad leaves, and smother out the weeds.

The rape makes excellent pasture for sheep, hogs and young cattle, and the field should be pretty free of weeds. Keep a watchful eye on it, however, as perennials are presistent growers.

This is a case of using the three best smother crops, Sweet Clover, buck-wheat and rape.

On the prairies I would not sow buckwheat unless it was to plow it in very early to add fibre to the soil, as, if allowed to ripen, it would give you a very troublesome volunteer crop the following year.

Treatment on the Prairies In killing weeds on the prairies, larger fields have to be dealt with, harvest is later, with little Autumn growth, and the condition of the soil is often quite different. One plan to combat the perennial Sow Thistle, as followed by Joseph Tremble, of Portage La Prairie, Man., is to harvest-plow the field, that is to follow the binder with a plow, and stook the grain on the plowed land. He does not plow, in this case, more than $3\frac{1}{2}$ or 4 inches deep. This will promote some growth in the Fall, or will at least bring the weeds on early the following Spring when he would plow again, as late as possible, and sow to barley or sixty-day oats and at the same time seed with Sweet Clover. If the land has not grown clover before, inoculation is recommended to ensure a good even stand and scarafied seed should be used. The barley or oats will be cut before many thistles are seeding. If a farmer has a silo a good plan would be to sow oats, or oats and vetches, and cut the crop for ensilage as soon as the weeds came in flower. Sow Thistle makes good ensilage and the seeds will not have much chance to produce an additional crop in a silo.

The following year Mr. Tremble advises cutting the Sweet Clover in June which will ensure a very thick second growth, making an excellent smother crop, and also a valuable crop to plow in. In cleaning up Sow Thistle, Mr. Tremble says, he got 8 to 10 bushels more wheat to the acre off land treated this way than off land that was Summer fallowed. There was the additional advantage of a light crop of Sweet Clover hay cut in June.

Mr. A. Bowman, of Guernsey, Sask., who is farming on light soil, with a strong tendency to drifting, finds it advantageous

to sow rye grass with the Sweet Clover to add the necessary fibre to the soil. He pastures this crop, cuts hay off it the following year, and then breaks it shallow and backsets it for wheat the next season.

If a plan of Summer fallowing is followed the field should be kept black. For this purpose a broad share, or duck foot, cultivator should be used and a rod or cable weeder is useful at intervals. Keep the weeds cut or pulled as often as they come up. Always remember, however, that the same treatment will not kill all kinds of weeds.

Canada Thistle Canada Thistle requires a much similar treatment on the prairies as that given to Perennial Sow Thistle and is quite difficult to eradicate. In Ontario there is little excuse for Canada Thistle getting any hold on the soil. It is an evidence of bad farming and exhausted soil. Build up your land with Sweet Clover and fertilizer, cut the thistles in the crop before they come in flower, plow light after harvest and deeper later in the Fall and you will clean them out quite easily.

Bunch Perennials Bunch perennials like Bladder Campion, Wild Carrot, Chicory, Oxeye Daisy, Bindweed, etc., are not so difficult to eradicate as those with a more vigorous running root stalk, but methods similar to those used to clean up Canada Thistle may be followed, and wherever any of them are found in a pasture, have a few sheep to turn in. Cultivate carefully, use smother crops effectively and always have the sheep to help you in cleaning up. If there were a few sheep on every farm, there would be fewer farms overrun with weeds. Bindweed is one of the hardest to kill. A Summer fallow will kill it provided you can pick a dry Summer to do it in. This weed, however, doesn't crowd out the crop to any great extent, and many farmers say they find it the most difficult to completely eradicate, but every effort should be made to keep it in check and if the land is put in good heart crops will crowd it out.

Couch or Quack Grass Couch Grass is in a class by itself. It is not quite like any other weed and requires different treatment. On the prairies it makes rather good pasture and will cut fair hay, but it is so troublesome no one considers it anything but an enemy.

In small patches of Couch Grass, covering a very few acres, a one-time plan was to plow it and shake out the roots with a spring tooth cultivator, rake them up with a sulky rake and pile them on a piece of sod and when dry burn them. There will be no doubt about those burned not growing, but you must be sure to gather them all and the labor entailed is excessive and costly.

Farmers who have been fighting Couch Grass on large fields, running up to quarter sections of land, find they can get quite as good results without gathering the roots. The result you must work for is to leave the roots lying on top of the ground to be killed by the sun and the wind, after which they will quickly rot.

It is not well to undertake too large an area of Quack Grass to clean out in one year, as it must be done thoroughly. It seems to be quite the best plan to plow the field shallow in the Fall, just deep enough to lift the roots, and leave the frost to do a Winter's work on them. This land will then pulverize in the Spring under a harrow, as it is a bad custom to use a disc on it. Your object is to pull out these roots, shake them free of earth and leave them lying in the sun. A disc not only cuts them in pieces so they are more difficult to pull out, but it really plows them into the ground, carefully covering them so that two blades of Quack Grass may grow where only one grew before.

A spring tooth harrow is the implement to tackle this pro-



Couch or Quack Grass
(Courtesy, Seed Branch, Dominion
Dept. of Agriculture)

position with, and most farmers, who have tried it, are agreed that the Kover harrow is the best implement yet produced for this purpose. Its long spring teeth, placed well apart, with the points, and about six inches of the tooth, horizontal while running in the ground, catches the roots like strings, pulls them out and, as they work up the back of the spring tooth, they straggle off and are left high and dry. This harrow is built in sections and a six-horse size will cover fifty acres a day.

This harrowing must be done on a bright day else it is not nearly so effective. This is a good reason for not attempting too large an area in one season. The land requires to be harrowed in this way ten or a dozen times, then plowed and followed by some eight or ten additional harrowings. Two Manitoba farmers, Herbert Grose, of Virden, and George Doblyn, of Kenville, have effectively treated Quack Grass after this fashion. This treatment means keeping the land idle for one year but that is necessary where Couch has got a firm hold.

The number of harrowings required seems large, but if you have an implement that covers fifty acres a day the work is not so difficult to perform nor so very costly.

Biennials The principal biennial weeds, or Winter annuals, as they are often called, are mostly confined to the prairies. The chief ones being Tumbling Mustard and Stink Weed. Tumbling Mustard has no respect for your neighbors, and as its name indicates, rolls over the prairie until it meets a woven wire fence, and then often gets over it. Plants have been known to travel many miles and still carry some seed, consequently, it is dangerous to allow this plant to mature.

Harrowing after the grain is up will kill a good deal of it. If



Tumbling Mustard
(Courtesy, Seed Branch, Dominion
Dept. of Agriculture)

the field is badly infested, Summer fallowing is the best remedy, and never allow the weeds to get up any height. Keep the fallow black all Summer. Harrow, and use a rod weeder that pulls the weeds up by the roots. Keep cultivating at every sign of greenness late into the Autumn. Save this field for oats or barley in the Spring, so it can be cultivated after the weeds sprout and before sowing. Keep harrowing until the grain is eight or ten inches high, and then, if odd stalks of mustard appear, hand pull them when in flower.

Stink Weed This weed, sometimes called French Weed, may appear in small plots. If it does, use a hoe crop as for Sow Thistle, or if not too large a plot dig it out. If it is scattered over the field, then proceed to Summer fallow as for Tumbling Mustard. Cultivate, in the Fall after the crop is off to get it to sprout if possible. In any event proceed to Summer fallow destroying the weeds every time they show green. You must be sure to fallow it over the next Winter, after Summer fallowing, and cultivate it when the weeds sprout in the Spring. This is the only way to be at all sure of the destruction of a Winter annual, because, like Fall wheat, it will come up the following Spring.



Stink Weed

(Courtesy, Seed Branch, Dominion
Dept. of Agriculture)

After Summer fallowing a field infested with Stink Weed, a good plan is to seed it to Brome or Western rye grass and leave it in hay or pasture for two or three years. Use oats for a nurse crop in seeding it to grass, and if weeds appear in the crop, cut it very early for green feed, or better still put it in the silo for ensilage. Stink Weed is mostly found on the prairies.

Burn Straw and Weed Seeds If you have Tumbling Mustard or Stink Weed on your farm, burn the straw, if possible, from the infested fields. See that the thresh-

ing machine is cleaning out all the weed seeds and burn these weed seeds. Re-clean the oats before feeding them to your horses. These may seem to be difficult precautions to observe, but the value of your farm is at stake.

Annuals Annuals, like Wild Oats, Wild Mustard, Ball Mustard and Russian Thistle, are also bad medicine for crop production. The roots do not live over Winter, however, and it is only the seed you have to clean out. If you get them sprouted in the Fall, they are much more easily handled. One difficulty, however, is that their seed will live almost anywhere and does not readily lose its vitality, and if buried too deeply to grow, will lie there until brought to the surface, when it will grow with great vigor. It is said that five years is the limit to which Wild Oats will live, and if the land is used for pasture and hay for five or six years the Wild Oats will disappear.



Wild Oats

(Courtesy, Seed Branch, Dominion
Dept. of Agriculture)

If not too thick, hand pulling of Wild Oats or annual mustards is the best plan. Otherwise, cultivate after the crop is off, making a surface seed bed to encourage the seed to sprout. Wild Oats do not sprout in the Fall but will come early in the Spring and you can get after them then.

Wild Oats should not be plowed under until the growth is strong enough to have completely exhausted the vitality of the seed. When they have a good strong growth, almost into the shot blade, plow them down, going a little deeper than the first plowing so as to bring up any grains that have been buried.

Your main object in destroying Wild Oats is to get all the seed that is buried in the land to grow, and then kill the plants by cultivation. If you feel you cannot afford to lose the use of the land for the Summer, seed it to oats late in the season and if you have no silo, dig a trench silo and make ensilage of the crop. It is the only safe method. You might seed to Sweet Clover with this crop and cut for hay the following June, plowing down the after grass in the early Autumn and putting your land in good condition for wheat. If the land is very dirty you might better follow the oat crop, of which you made ensilage, by plowing early, and if the Wild Oats come up plow again in the Fall. Then repeat the performance of sowing an ensilage crop and this time



Suffolk sheep at Maple Shade, the farm of W. A. Dryden, Brooklin, Ont.

seed to Sweet Clover. Cut the clover, as already suggested, early for hay or ensilage and you should be pretty well rid of these pests. Watch for further appearance of them and hand pull them. Making ensilage out of the crops containing Wild Oats is an excellent plan to prevent the Wild Oats from seeding. Even if cut green, their grain will ripen, but if put in the silo they have no possible chance.

Importance of Live Stock From this it will be seen how important live stock are on a farm in keeping weeds in check.

A silo is of no use unless you have cattle to turn the ensilage into money. Mixed farming is the cure for weed-infested land, and while many wheat farmers are little inclined to take it up, they must be governed by circumstances. In many cases they can carry on wheat farming for years, because of soil conditions, and keep the weeds under control, but when



*Group of Holstein cows owned by Mount Victoria Farms,
Hudson Heights, Quebec*

they find the weeds gaining the upper hand they must change their methods or find their property values depreciating very quickly. A few head of cattle, a flock of sheep and a silo are great weapons to fight weeds with if carefully managed.

Be sure to sow clean seed every time for your grain or grass crop. Take no chances on this. Planting weeds, while you are spending time and money in efforts to eradicate them, is a very wasteful business. Clean your seed grain with scrupulous care, and get clean grass and clover seed.

In Public Schools It would be a fine thing if the identification of weeds and some simple plans for their eradication were taught in the public schools. If all our boys and girls were in a position to readily recognize noxious weeds and to understand something of the menace they are to the profits of their farm, they would be so alive to the dangers from them that a war on weeds would be started which would soon prove most effective.

In the preparation of this information on weeds we received valuable information from J. D. Smith, of the U.F.O. Co-operative Company's Seed Branch. Mr. Smith was for several years in charge of the Seed and Weed Branch of the Alberta Department of Agriculture, and is one of the best authorities in Canada on Seeds and Weeds.

*Chapter V***FERTILIZER**

OF all the constituents of the soil that crops remove, there are only three that ordinarily need to be replaced. These are nitrogen, phosphoric acid and potash. The humus content of the soil must be kept up, of course, when worn out by cultivation, and lime is required to sweeten acid soils, but the three chemical constituents we require to put back are as above mentioned. Humus, as previously stated, aids the soil in retaining moisture, admitting air to plant roots, and accumulating heat to promote growth. Barn yard manure is, consequently, the best soil restorer to be found since it adds all three required chemical constituents, nitrogen, phosphoric acid and potash, and at the same time organic, or vegetable matter which furnishes additional humus.

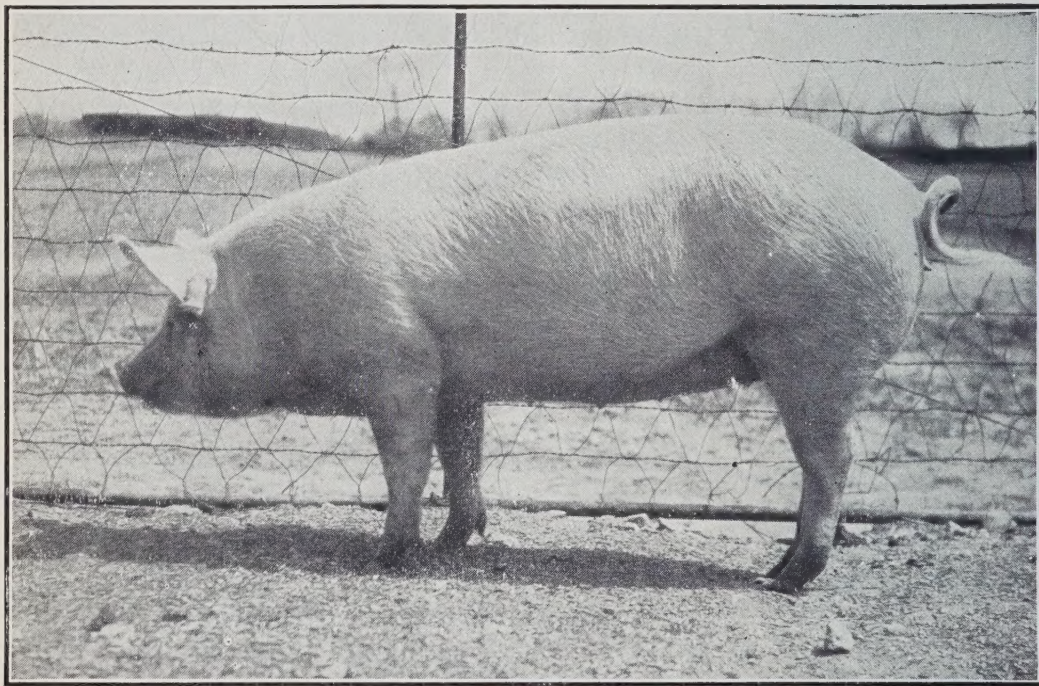
Farm yard manures are also teeming with bacteria which not only work chemical changes in the manure itself, but cause otherwise insoluble plant food in the soil to be liberated and made available to feed the growing crops. Manure of this kind returns to the land more nearly what it has lost in producing crops than will any other form of fertilizer. Thus we see the importance of livestock to farming and keeping up the fertility of the soil. In every country of the world successful and permanent agriculture has its foundation in livestock farming.

The value and fertility of barnyard manure is largely determined by the feeding of the livestock, which is the reason why the British farmer feeds so much concentrates to his fattening animals. You cannot return all the fertility to the soil, taken from it by growing crops, through barnyard manure, even if you feed on the farm all the crops grown upon it, hence the necessity for supplementing this fertilizer. This may be done by using legumes such as Alfalfa and Sweet Clover to supply the nitrogen, and applying potash and phosphoric acid in the form of commercial fertilizer. Nitrogen, of course, can also be applied in commercial fertilizers. Many British farmers purchase large quantities of "cake" to feed their livestock and thus increase the

amount and value of their barnyard litter, to keep up the strength of their land.

It is important that farm yard manure should be properly conserved and handled so that all its value may go back to the land. Bedding should be liberally used for all livestock to absorb the liquids and so prevent waste. If the straw used for bedding is cut, it will handle and spread better. Many threshing machines now cut the straw as they thresh it.

The time of year to haul out manure has been a matter of general dispute, but considering the way it is handled in most barnyards, where it is subjected to wasteful leaching, it is generally the best plan to have it hauled to the fields directly from the stable. There is less loss this way and the work is done in Winter when there is more time. It might be spread directly on the field, or piled in the field for later distribution, or thrown in small heaps to be spread before plowing.



Yorkshire sow, bred by Dominion Experimental Farm, Ottawa, Ont.

It is quite true that in many parts of Western Canada, barnyard manure is discarded as an unnecessary nuisance, and the continued fertility of the soil is simply amazing. In some cases the addition of manure would only produce, in the crop, a troublesome abundance of straw, but time will likely change all this and in the end it will be needed and valued, even on the black land. On the lighter or clay soils, it will warm and improve them, and will be required very soon, if the land is to be kept in good cropping condition.

Commercial Fertilizer Commercial fertilizers can be very profitably employed in Ontario. They should be used to supplement the litter from the barnyard, but they certainly should be employed rather than to let the fertility of the soil be greatly reduced. In the article on Summer fallowing we have dealt with the value of plowing in a green crop such as Sweet Clover, which is an excellent method of fertilizing worn out land, and one that should be practiced on our farms much more than it is.

Commercial fertilizers are of great variety and combination. The most common mixtures for grain crops consist of nitrogen, phosphates and potash and are often designated by figures. In these figures the constituents of the fertilizer are indicated in the order named. That is 4-12-4 means that this mixture contains 4% of nitrogen, 12% of available phosphates and 4% of potash the remainder of the mixture being "filler" to aid in distribution by giving it bulk.

A mixture designated as 0-12-6 means an absence of nitrogen and is used where the land has had its nitrogen content increased by the use of legumes, while 0-16-0 would mean the addition of phosphates alone to the land.

Double strength mixtures taking less distribution can also be purchased. Tables and formulae, as well as amounts recommended, for different crops can be secured from reliable dealers in fertilizers.

Where land is badly run down the application of commercial fertilizer together with plowing in a green crop such as rye or buck-wheat, will bring it back to the production of heavier crops which can in turn be changed into manure, by being fed on the

farm, to preserve and improve the tilth of the land.

Nitrate of Soda Nitrate of Soda has been used quite extensively by itself for fertilizing purposes, though it is more often used, as is Potash, in combination with superphosphate, and of course all three form many combinations. Nitrate of Soda, however, is used by itself on orchards and vegetable gardens where an extra supply of nitrogen is required, and also on pastures and Fall wheat in the early Spring as we have described elsewhere.

Nitrogen is absolutely essential to successful growing of crops and on no account should a farmer neglect to see that its content in the soil is kept well up, either by the growing of legumes or the application of Nitrate of Soda.

Superphosphate or Acid Phosphate Superphosphate, or acid phosphate as it is frequently called, is used to supply available phosphoric acid to the growing crops.

This fertilizer is one that is most commonly needed to stimulate the growth of plants. In most mixtures there is usually a higher percentage of phosphates than any other ingredient. Where land has been supplied with nitrogen and humus by plowing in a leguminous crop, it usually requires the application of superphosphate to bring the crops on quickly and produce a good yield of grain.

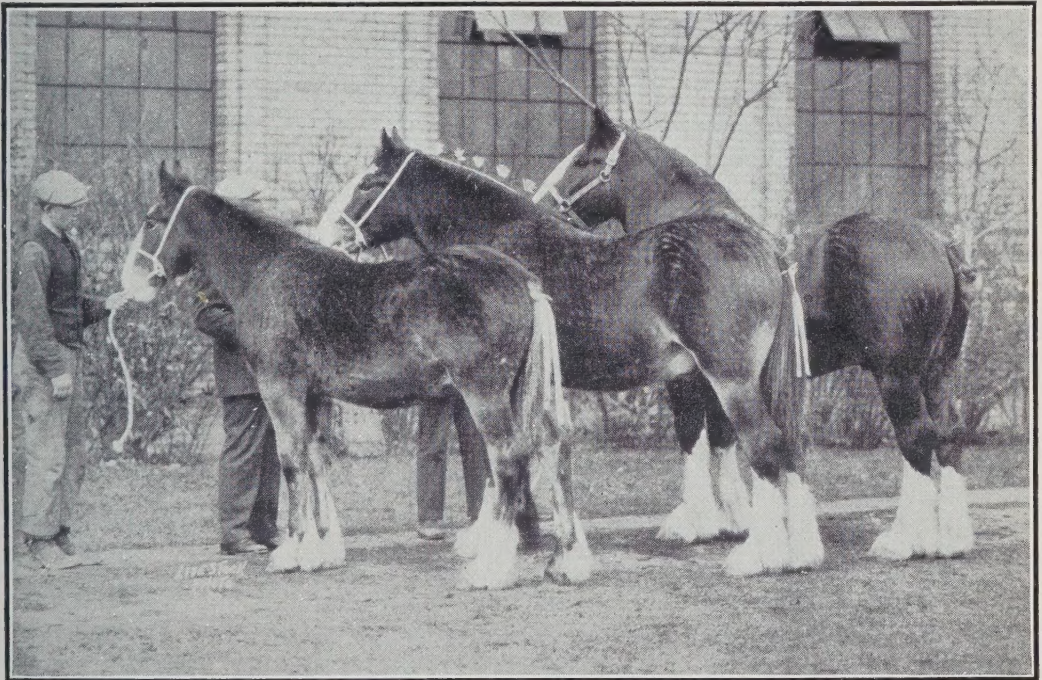
Phosphoric acid in the soil promotes root development in the young plants in the early stages of their growth, and later on it feeds the plants when the production of seed is taking place. It will be seen from this that phosphate will nourish a grain crop at two vital periods in its growth. First when the seeds are sprouting and anchoring themselves in the soil by root growth, and second when the heads are filling to return a good yield of grain.

Phosphates are supplied to the land in the form of bone meal or as superphosphate. The latter is produced by the treatment of phosphate rock with sulphuric acid. There has been an opinion expressed that acid phosphate burns the land. This is erroneous, as there is no free sulphuric acid in the mixture. This idea originated from the fact that first applications of acid

phosphate stimulated vigorous growth, but later on the land refused to respond to treatment by it. The reason for this is that phosphate alone is not a complete plant food, and that in growing crops after its application the nitrogen and potash were also exhausted, but not replenished, and so crops would not grow on too much phosphate and not enough nitrates and potash.

In feeding your soil, as in feeding your animals, you must use a balanced ration, so be sure to see that you are keeping up your soil fertility in a well-balanced manner and the results will repay you for your efforts.

Potassic Fertilizers Potash is one of the essential elements of fertility that must be restored to the soil when it becomes depleted. Root crops and silage crops respond readily to an application of potash. This fertilizer is required more on sandy and gravelly soils.



Browndale, His Majesty, and His Eminence, winners of Clydesdale get of sire at Chicago International. Got by Dunure Norman. Owned by Dominion Experimental Farm, Indian Head, Sask.

Wood ashes is one simple means of applying potash to the land. Seaweed is strong in potash and compounds such as muriate of potash, sulphate of potash and carbonate of potash may be purchased as commercial fertilizer and used with success in supplying plant food to the land. In every case potash should be used in connection with a supply of phosphates and nitrates as your soil may require.

Acid Soils When soils become acid they require treatment with lime to sweeten them. The failure of Alfalfa or clovers to grow is often an evidence of this condition. Lime is a great soil corrective and is a great aid to the bacteria that work on the roots of leguminous plants. In a case where clovers fail to grow, the soil should be tested for acidity. If it shows a sourness then it is deficient in lime and a liberal application of ground limestone will work a great improvement. Lack of lime is one of the common ailments in soil, and it is frequently well worth while having tests made for acidity.

Fighting Weeds If you have weeds in your land the first thing you should do is to make a liberal application of fertilizer.

Weeds thrive on poor soil, while grain crops refuse to grow, with the result that the crop is crowded out. Make a liberal application of fertilizer to your land. It will bring on the crops to crowd the weeds out. This will give your crops the advantage they require to make good returns. Build up your land with commercial fertilizer to raise crops to crowd out the weeds and produce heavy yields of grain to feed to livestock, from which you can return barnyard manure to the land to sustain its fertility.

“Feed your soil and it will feed you.”

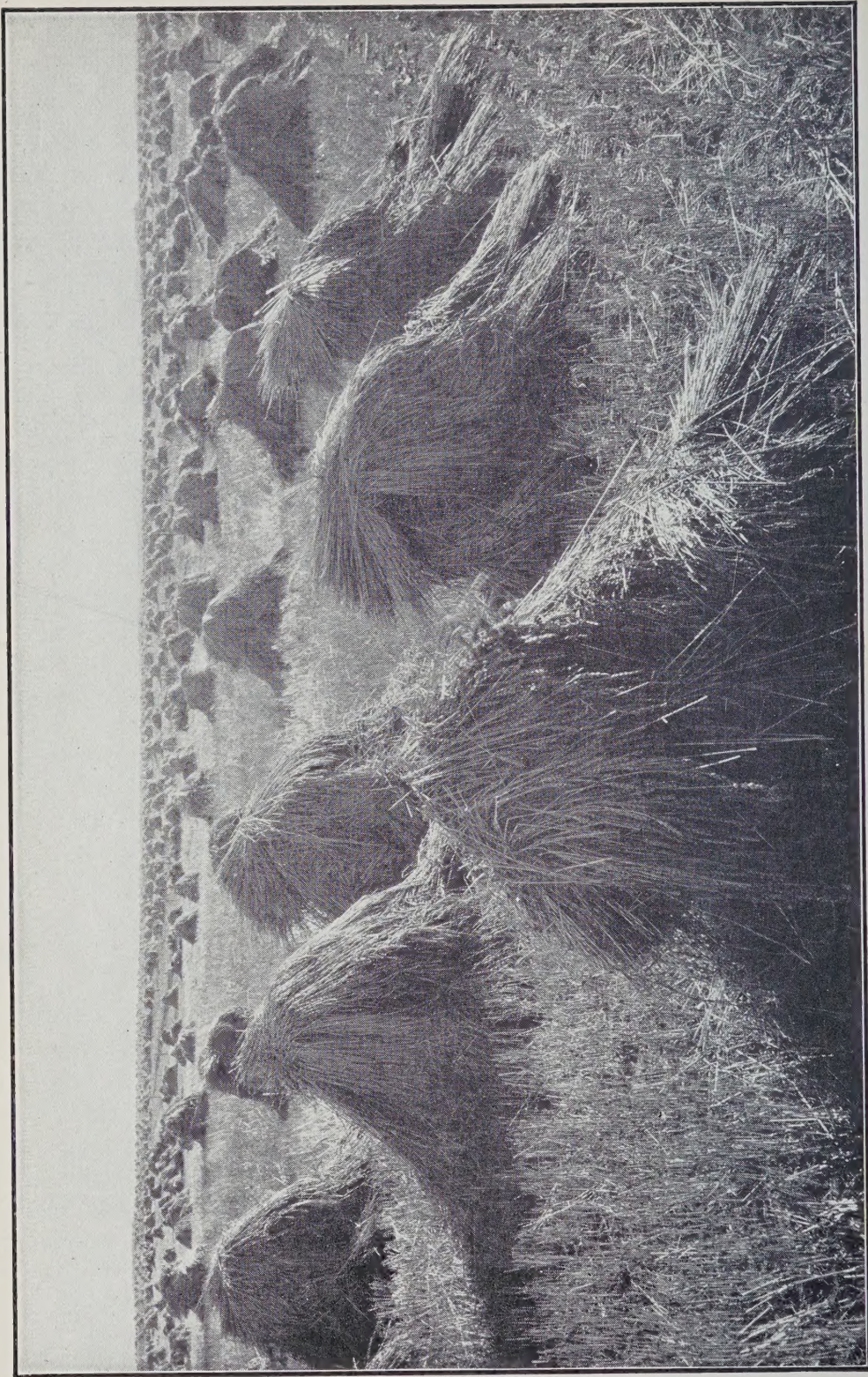
*Chapter VI***GRAIN CROPS**

GRAIN crops will always form a large and important part in Canadian farming. The most convenient and easily produced cash crop on a farm is a crop of grain. When a farmer breaks new land his first return to pay the cost is a crop of wheat, oats or flax. There can be no doubt that livestock is the best means of returning to the soil the fertility exhausted by grain crops, and also that the grain crops are required to feed the stock. Live stock farmers must also be good grain farmers to succeed, so that any discussion of Canadian Agriculture must find its basis in the production of grain.

Wheat Wheat is the largest and most important grain crop produced in Canada. The growing of wheat on the Western prairies has been, in recent years, stimulated by fairly high prices with the result that wheat farming has far outstripped every other line of agriculture in the three prairie provinces, and has expanded to such an extent that the total value of the wheat crop of Canada today is equal to or slightly greater than the combined value of all other agricultural production in Canada.

Marquis For the past ten or fifteen years Marquis has been the most popular and profitable variety of Spring wheat grown in Western Canada. Red Fife was the original hard wheat brought into Western Canada and grown there, but its difficulty was its lateness in ripening and it often was the victim of early frost. Marquis wheat was produced by the Dominion Experimental Farms, largely through the efforts of Dr. Chas. E. Saunders formerly Dominion Cerealists, to whom Canadian Agriculture owes a lasting debt.

Its chief value is that it ripens several days earlier than Red Fife, is a heavier yielder by at least five bushels per acre, has a stiffer straw, is not so liable to shelling in cutting and produces as high a quality of hard wheat. In producing early varieties of grain, frequently the yield in bushels has to be sacrificed to



A prairie wheat field

some extent, but the reverse has been the result in the case of Marquis. Another difficulty with new varieties of wheat is that they often revert to type and so lose the very qualities that make them a new variety. Marquis has not failed in this respect. It is clearly a fixed variety of excellent hard wheat suited to Western Canada, a good yielder, and has splendid milling qualities.

Garnet Garnet Spring Wheat, a new early ripening variety introduced into Western Canada in 1926 by the Federal Department of Agriculture is proving a distinct boon to those sections which are subject to Summer frost. In these districts a large proportion of wheat hitherto falling into the lower grades has caused grave concern but with the advent of Garnet, the whole situation bids fair to be changed.

While not considered quite the equal of Marquis in quality, grade for grade, Garnet is entitled to be graded among the good milling wheats. Its propagation, furthermore, should mean a general improvement in the quality of the wheat produced in the districts referred to, on account of the higher grade of wheat it is capable of producing under these conditions.

Reward This is a new variety from which something is expected. It ripens five or six days earlier than Marquis and Dr. Chas. E. Saunders is of the opinion that it will prove very useful. It has given some excellent yields at the Brandon Experimental Farms and in 1922 weighed $64\frac{3}{4}$ lbs. to the bushel. It has fine plump kernels and is a good "Show Wheat."

Renfrew Renfrew is a new wheat accepted by the Canadian Seed Growers' Association for registration in 1927. It has no particular advantages over Marquis though in some tests it ripened a few days earlier, in others it was slightly later. In yield it was just about the same, though in length and strength of straw it appears to be slightly better which is an advantage in dry districts. It has not been proven as has Marquis, through years of growing in large commercial quantities, but it may likely prove a useful variety.

Durum Durum wheat has been grown during the last few years in parts of Manitoba, because it is high yielding, drought resistant, and some strains are rust resistant. The most popular variety of Durum wheat is Kubanka. A Durum wheat has been developed known as Mindum Durum. It is a milling, rather than a macaroni wheat, is a good yielder and its grain is very plump and attractive. It has been grown very successfully in Saskatchewan. Some of it has come East to Ontario for seed this Spring. In the Province of Ontario most of the wheat that is grown is Fall wheat as in this province it has proven itself a more successful crop than Spring wheat.

Seeding Wheat can be greatly improved by selection and the **Wheat** most simple method of selecting it is by a generous use of the fanning mill. It pays to clean your seed wheat very carefully, both for the purpose of eliminating weed seeds and also small grains of wheat. You can greatly improve your crop this way and no farmer should sow anything but **re-cleaned** seed.

Land intended for wheat should be in a good condition of tilth. It should contain a good supply of moisture and plenty available plant food. The soil should be free from weeds and grasses and cultivated so as to conserve the moisture content.

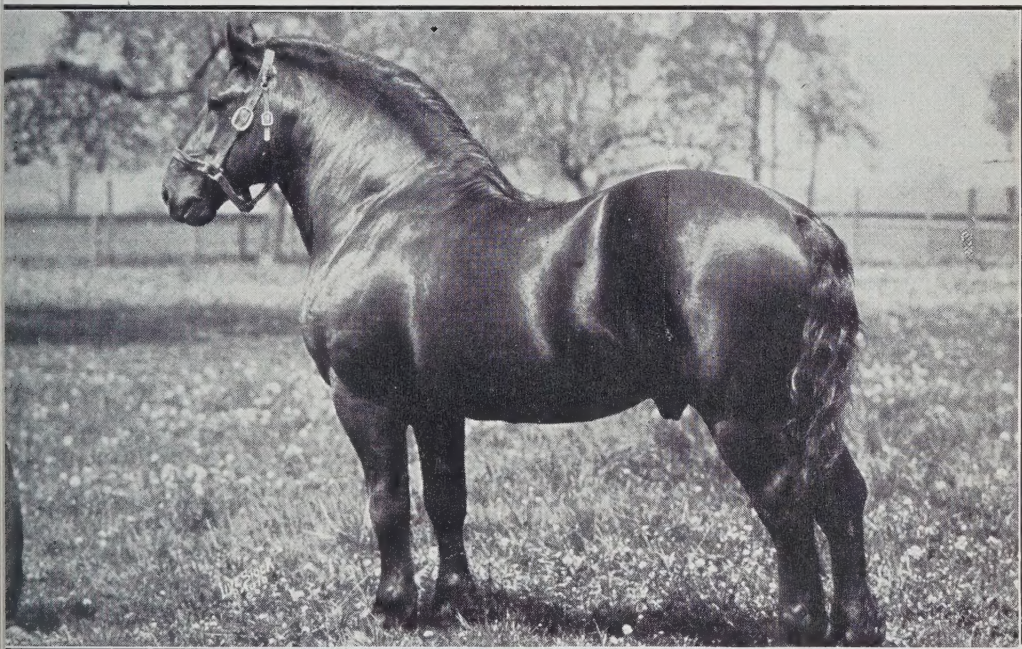
In many parts of the West, wheat does best on new breaking or Summer fallow, this is particularly true of what is known as the "Wheat Lands" in Western Canada. On deep, black soil, wheat is not so good a crop on new breaking, in fact, wheat on heavy, black, vegetable loam should not be sown until several crops of coarse grain have been harvested from this land, to reduce its humus content, and the tendency to grow too heavy crops of straw, and so be late in ripening.

Stubbling in wheat, for the second crop after Summer fallowing, is a common practice in Western Canada, and under some conditions, especially in a dry season, better results may be obtained this way than by plowing. This method, however, encourages a more rapid spread of weeds and is one that is dangerous to follow unless a farmer has his business well in hand. A crop of wheat that is stubbled-in does not cost very much to seed, and consequently may be a fairly profitable one.

Western farmers have scarcely got around to the point yet where they are required to use any fertilizers in the production of their wheat crop, unless perhaps in the older settled districts where a crop of Sweet Clover plowed in should greatly improve conditions and the application of superphosphates in addition should work substantial improvement.

Early seeding is of vital importance in growing wheat. Every day in the Spring counts because it enables the crop to beat a possible early frost in the Fall, so that all lands in preparation for wheat should be Fall plowed and sowed in the Spring as early as the farmer can get on with the work.

An interesting experiment was made last Fall on the Big 4 Farms at Flaxcombe, Sask., where about 250 acres were seeded to Spring wheat in October. The idea was to sow late enough so the wheat would not sprout this Fall but be ready to begin its growth with the first warm days of Spring.



*Laet, the greatest living show and breeding
Percheron stallion on this continent*

Amount Of Seed The amount of wheat to sow per acre in Western Canada seems to be very difficult to determine as soil conditions and locality must be taken into careful consideration in deciding this matter. In certain districts many of the best wheat farmers favor sowing only about one or one-and-a-quarter bushels per acre. They get better results by thin sowing and allowing the wheat to stool out. In other places up to two bushels per acre have been sown with good results. Lighter seeding is desirable in dry areas on lighter soil, or on stubble fields which contain a very limited supply of moisture. On deep, black land it is better to seed more thickly, thus preventing too much stooling and promoting early ripening, as thin sowing on deep, black prairie loam is liable to result in a heavy crop of coarse straw so full of sap that maturity is retarded.

Depth To Sow The depth at which to sow wheat has also got to be determined by the locality and the kind of soil as well as the moisture content. Wheat should be planted deep enough to reach the moisture so as to promote rapid germination, but it should not be planted any deeper than necessary for this purpose. This rule holds true with the seeding of all kinds of grain. On dry land it is dangerous to seed too shallow, as sufficient moisture may not reach the grain to start germination.

Fall Wheat Fall wheat in Ontario should be sown upon land that has been well prepared and is in good tilth. In localities where the hessian fly has not appeared, early seeding is generally found to be the best. Taking one year with another in districts of this kind, August seeding generally produces the best results. In districts where hessian fly has been dangerous, seeding should be later, say after the 10th of September.

A liberal application of barnyard manure, or plowing in a crop of Sweet Clover, is the best guarantee of a good crop of Fall wheat in the Province of Ontario.

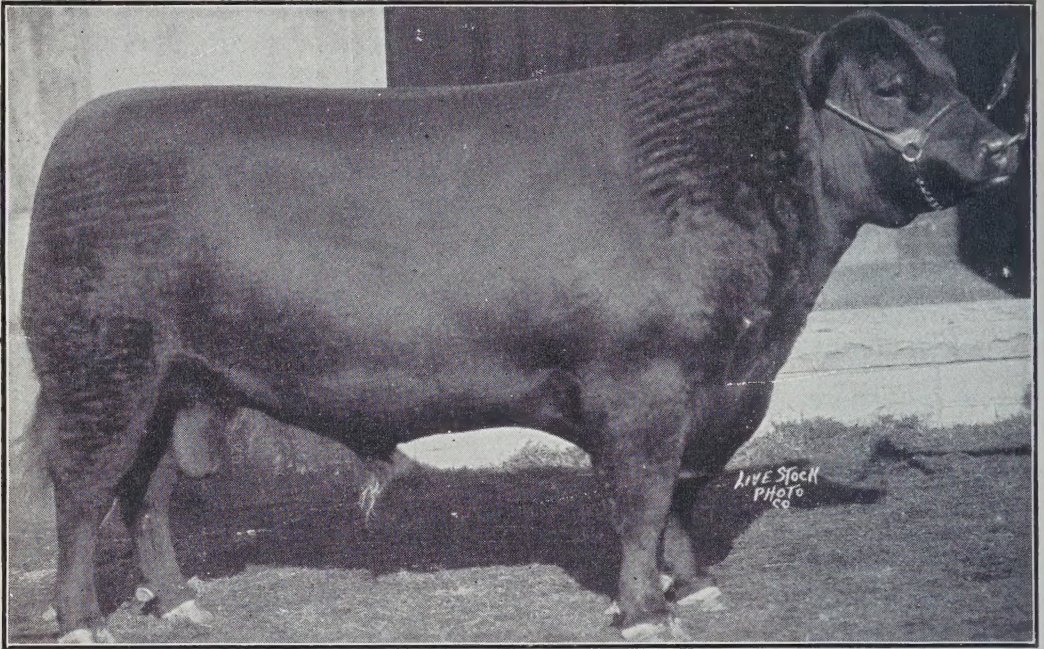
Fall wheat was successfully grown for a number of years in Southern Alberta. In the years 1908, 1909 and 1910 there were

some phenomenal yields of Fall wheat in that part of the West, but some years later it was rather a failure. In certain sections of the West, Fall wheat is being grown now with success.

Nitrates If Fall wheat looks ragged in the Spring, it can be **Effective** greatly revived by the application of about 150 lbs. of Nitrate of Soda per acre. This should be sown just as the frost is coming out of the ground. At that time of year, the nitrogen in the soil does not seem to be available to the wheat plants for sustenance, and if an application of soluble Nitrate is made in this way, it will have a wonderful reviving effect upon what might look like a very unpromising crop. There are perhaps few applications of commercial fertilizer that will produce more directly apparent results than this.

Oats Where livestock are carried on a farm the most important grain crop is oats. It is the best all-round livestock feed produced in the form of grain. Oats are not only excellent feed for horses, but they are first class for dairy cows, and because they contain a good supply of mineral matter they are the most desirable feed for young and growing animals, as the oats supply them with both muscle and bone building material. The heavy oats produced in Western Canada, are in themselves a superior feed. Western oats often weigh from 40 lbs. to 45 lbs. per bushel which makes them the best feed oats grown.

Oat straw is higher in feeding value and is more palatable for livestock than the straw of any other grain. For wintering cattle, it makes a very valuable roughage, and if you have some turnips to feed with it, it is surprising how well young cattle will Winter without being fed very much, if any, grain. Oat straw is also valuable for bedding, as it is soft and pliable, and so makes good litter. Oats are frequently made the basis for a mixed grain crop, with the addition of barley, peas or wheat, and in every case they serve a good purpose. The feeding value of oats will compare pound for pound very favorably even with that of wheat, in spite of the amount taken up by the oat hulls.



Revolution 7th grand champion Angus bull at Chicago International 1927, bred by J. D. McGregor, Brandon, Man.

The world's production of oats exceeds in bushels that of any other grain. In spite of the fact that wheat is the world's cash crop, oats are keeping the lead.

As they are a muscle-building rather than a fattening feed, oats are more valuable for work horses and dairy cows than for beef animals that are being fattened, but in making up a balanced ration for any kind of livestock good oats usually form an important part.

Very heavy yields of oats are secured in Western Canada, and 100 bushels per acre is not considered an extraordinary crop in many districts. Oats can be grown upon almost any kind of land, provided it is in a good state of fertility and cultivation. No farmer who is raising calves and sheep and doing his farm work with horses can afford to be without an oat crop.

Cleaning and Seeding

Care should be taken in cleaning seed oats, just the same as in cleaning seed wheat. On no account will it pay to sow weed seeds or small,

shrunken grain. Clean your oats down until you have good, clean, heavy seed. Give them an extra run through the fanning mill to be sure that all the light oats are out, then grind these light oats and tailings and feed them to the sheep. The rate of seeding for oats varies greatly, perhaps more than that of any other grain. On the lighter land and in the drier areas in Western Canada, many farmers seed very lightly, sowing as little as a bushel and a peck to the acre, while on new breaking, in the heavy black loam, at least five bushels per acre should be sown.

When you seed as heavy as this, if you have the time at all, it is much better to sow $2\frac{1}{2}$ bushels one way with the drill, and then cross it sowing $2\frac{1}{2}$ bushels more. On new, black land, or on Summer fallow where the soil is a deep black loam, the heavy seeding prevents 'stooling' and an exceedingly rank growth of straw, thus giving you an earlier and a better yielding crop.

In Ontario about 2 bushels to the acre is the average method of seeding. There is a good deal of land in Ontario, however, that perhaps should be seeded lighter. This should be the case on land that is not good at retaining moisture, as light seeding, allowing the plants to stool out liberally, generally proves best when the moisture content is low. Oats should never be sown in any part of Canada without being treated for smut as this crop is very susceptible to smut spores.

Varieties A good many varieties of oats have flourished for a time and then faded from sight, but though varieties may come and varieties may go, it looks as though "Banner" would go on forever. This is a heavy yielding oat with fine but strong straw and seems to be admirably adapted to Canadian conditions both East and West. It is not as early as some other varieties but it is a heavier yielder. The kernels are long, fairly plump, with low percentage of hull. This variety was appropriately named.

The Victory Oat The Victory may be also said to live up to its name from an exhibition standpoint as it has been a very successful prize winner. Victory oats captured most of the prizes won by farmers from Alberta and Saskatchewan at the International Show at Chicago. Victory

has short plump kernels making the grain very attractive. It is medium early in ripening but hardly up to Banner in its yield.

O.A.C. 72 was produced at the Ontario Agricultural College, as its name would indicate and has been a very satisfactory oat in Ontario. It is estimated that twenty-five per cent of the oats grown in that province are of this variety.

O.A.C. 144, another College variety, has in tests covering five years, yielded rather heavier than 72. On rich soil, however, 144 is apt to grow too much straw and so is not generally favored over 72.

Barley Barley is excellent grain for livestock feeding where a farmer is making beef or pork. When your hogs get over a hundred pounds, it is a good plan to have a barley ration for them. When you put a bunch of steers into a feed lot, nothing will play a more important part in putting on gain than barley in their feed. Barley grows well on a good loam, with a reasonable amount of drainage. It requires land to be fairly fertile but it can be grown very successfully on a field where barn yard manure has been applied to a previous crop and so is well rotted before the barley is sown. Barley is also a crop that will respond well to commercial fertilizer, and for it phosphoric acid and potash are rather more necessary than nitrogen. The many seedling roots which barley throws out near the surface enable it to use commercial fertilizer quickly and to very good advantage.

Barley, like every other grain crop, does best in a well prepared seed bed, and should be sown if possible on Fall plowed land. As barley is an early maturing grain it is usually not seeded until after all the other grain has been sown. While this plan can safely be resorted to, it is well to see that the fields in which the barley is to be grown have not lost their moisture content by evaporation. If you are not ready to sow the barley because you want to use the seed drill in sowing wheat, oats, or some other grain, at least give the barley ground a stroke with the harrow so as to conserve the moisture in the field and kill some of the sprouting weeds.

Barley is generally seeded at the rate of about a bushel and a half to two bushels to the acre. In drier sections, however,

good results have been obtained from sowing as low as one bushel to the acre. There is a prevalent fallacy that you will destroy a barley crop by harrowing it when the young plants are up a couple of inches. If there are weeds in the field or a crust on the surface of the land to break, do not be alarmed about this, but give it a stroke of the harrow. It may be best to harrow it lengthways with the rows of young plants coming up, rather than to cross-harrow it, but you will do it a great deal more good than harm by giving it this cultivation.

Surface cultivation always kills weeds and assists grain crops. As barley is a quick growing grain, the short period between sowing and reaping gives the farmer an advantage over weeds.

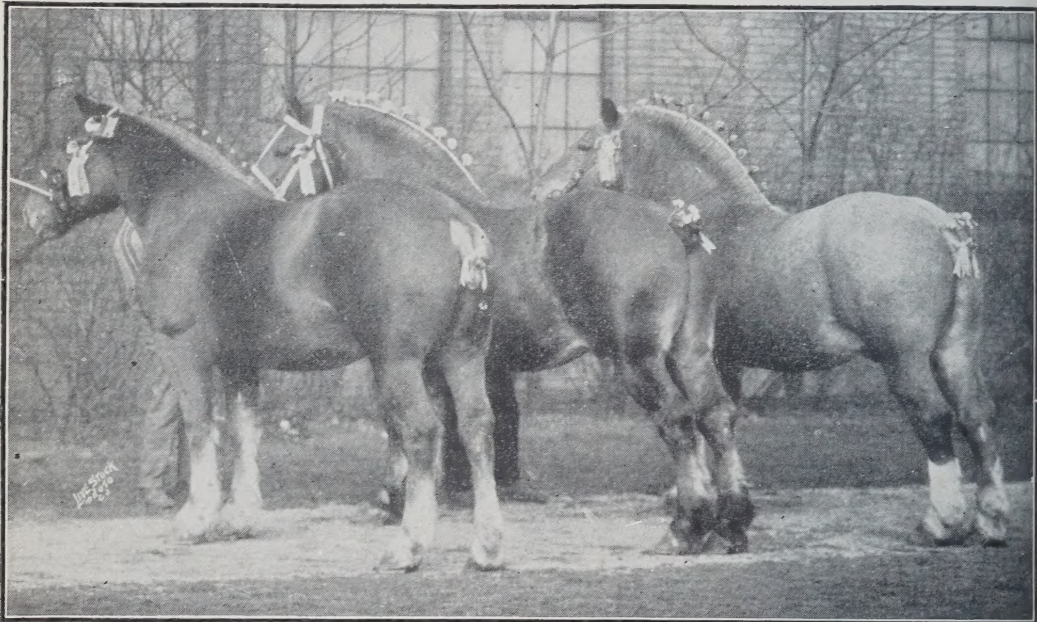
Varieties There are two distinct types of barley, six-rowed and two-rowed. Of the former, the most popular varieties are Manchurian, Trebi and O.A.C. 21. These are good yielders and do well in Ontario and on the black land of the prairies. The two-rowed varieties do better on the drier parts of the prairies. Two good varieties of two-rowed barley are Duckbill and Early Chevalier. A six-rowed variety, called California, has done well on the prairies, and a two-rowed variety, Canadian Thorpe, has been a good yielder in Alberta. It is estimated that O.A.C. 21 amounts to nearly 80% of the Canadian barley crop.

Peas The growing of field peas has been more or less neglected in Canada for some years. Quite a time ago the weevil worked such havoc among peas in Ontario that the crop was almost abandoned. The difficulty in harvesting has also been the means of keeping down the area sown to peas.

Peas are very valuable for feeding cattle and hogs for market. Protein is the most valuable constituent of all food stuffs, and peas contain at least double the percentage of protein that other grains carry. Peas also contain phosphorus and potassium in generous quantities, so that they are a valuable addition to any grain ration for either growing or fattening stock. Pea meal is rather heavy feed to be given alone, except in finishing hogs or prime cattle, and even then it is better mixed with oats, barley or oil cake, or a little of all three.

Varieties Arthur is a medium early variety and is highly recommended for Western Canada. It is a fairly large pea of yellowish color, and is very similar to Canadian Beauty and Marrowfat, both of which might be classed with it.

Golden Vine is a heavy yielding small white field pea. Its grains are of very uniform size, which has made it a good "show" variety. Alberta captured the championship of 1928 at the Chicago International with Golden Vine.



Grand champion Belgian mare, Mary Jane de Naz, owned by R. J. Ferguson, Drinkwater, Sask., grand champion Belgian stallion, Goliath, owned by C. M. Rear, Regina, Sask., and reserve grand champion Belgian stallion, Sir Gaston owned by Andrew Nolan, Rouleau, Sask., at 1928 Toronto Royal Show

The University of Saskatchewan produced a good feeding and early maturing variety in Early White.

Prussian Blue and Alberta Blue are very good varieties of blue peas, but for some reason blue peas have never become keen competitors with white ones.

In Rotations Peas, regularly grown as a crop, play a useful part in a rotation. Peas do best on sod or Summer fallow as they must not be sown on weedy land. The

weeds will simply choke out the peas. As the pea is a legume, it stores nitrogen in the soil and so enriches the land for the next crop. In Ontario we used to sow peas on sod, get them in early and harvested early enough to sow Fall wheat, then a corn and root crop followed by oats or barley with which crop the field was again seeded to grass. Sweet Clover has largely taken the place of peas, but in any event we strongly advise sowing small field peas in all mixed grain crops. They are very valuable there.

Pea Straw and Hay Pea straw, when ripe, is excellent feed for sheep, they like it, and as straw goes, it is nourishing. When cut up with oat straw, it makes good cattle feed and when mixed with ensilage it is excellent roughage.

Peas and oats cut green make very good hay, or green feed. In this mixture it is well to let the grain get fairly matured or else it is likely to be too full of juice and so shrink too much. Peas and oats make good ensilage, but we doubt if peas add as much value to the ensilage as they do to green feed. When cut in time to put in the silo, the peas are often too immature. An early variety of peas and a late variety of oats might make a good mixture for this purpose.

Rye Winter rye is a very valuable crop to grow in Canada and one that farmers do not give as much attention to as they might. Rye will grow on poorer soils than most other cereals, and it can be sown on land which is low in fertility or not in good enough tilth to produce another sort of grain crop. When land is in that condition a good plan is to sow Winter rye and seed it down to Sweet Clover. This will probably give you a fair crop of grain, and if you plow in the Sweet Clover the following year it will put some heart into your land. Rosen Rye is a variety that has been introduced into Canada during recent years, the grains are much larger than ordinary rye and the yield a good deal heavier.

Rye makes excellent feed for finishing beef steers and hogs, but is rather strong to feed to young cattle or young pigs. It is best always to mix rye with other grain in feeding. Mixing with oats is a good plan, as rye ground alone becomes something of a

sticky mass when wet. Western Canada is particularly well adapted to the production of good crops of rye and this grain should find an important place in Canadian crops.

Winter Rye makes a good pasture for cattle in the late Autumn and early Spring. It should be sown in August or early in September and the stock should not be turned on until it has a good heavy top.

It will give dairy cows a green bite long after the grass has dried up, and it will also give the cows their first green feed in the early Spring. As soon as the frost is out of the surface of the land, in the Spring, the rye should be harrowed. This breaking of the crust on the surface of the field, and stirring up the soil about the roots of the plants, will bring the crop on with a more vigorous growth.

Mixed Grain Crops Where livestock farming is followed and the plan is to feed most of the grain grown on the farm, it is a good idea to grow mixed grain. The yield is much heavier than that from a single variety and the feeding value can be greatly improved. In Ontario, crops of mixed grain can be grown very successfully and the difference in their time of ripening will matter but little.

A useful mixture to sow per acre is 1 bushel of oats, $\frac{1}{2}$ bushel of barley, 15 lbs. of goose wheat, and 10 lbs. of peas. If with this, you mix just a trace of flax seed you will get an ideal mixture for feeding hogs or steers, and one that will give you a heavy yield. We have seen 100 bushels to the acre of such a mixture grown in the county of Peel. All these varieties of grain do not require exactly the same plant food and so the land can sustain a heavier crop. With each kind of grain sown thinner than usual it seems to stool out better and in this way a larger yield for the amount sown is certain to be the result.

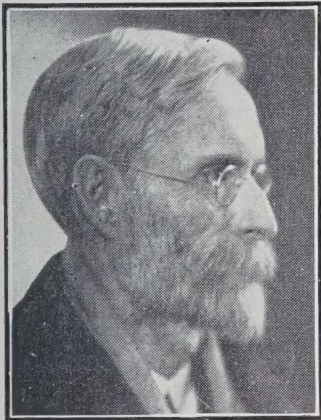
The different varieties of grain should be thoroughly and carefully mixed and should be treated with Formalin before being sown. The flax can best be added in the grain box of the drill and mixed there with the other grain.

On The Prairies In the Prairie provinces the peas should be, as a rule, omitted from the mixture, unless the district is one

suited to the growing of peas. On some of the black prairie lands the peas would only result in an abundance of straw with little or no additional grain.

In the heavy oat yielding districts of the West, where the oats are intended for feed, a good plan is to sow some flax with the oats and thus improve their feeding qualities for horses, calves and young pigs. This plan would apply in Ontario also as the mixed grain crop is too heavy a feed for horses or young stock. Land for growing a good crop of mixed grain should be fertile, and in a first class state of cultivation.

One Ontario farmer says he gets better results with Huron Wheat in his mixed grain than by using Goose Wheat. It stands up well even with peas clinging to the straw, and yields well.



DR. C. E. SAUNDERS

The Making of New Varieties The contribution of Marquis Wheat to the grain crops of Canada was one of the most valuable made during the century. Dr. Chas. E. Saunders, Cerealist of the Dominion Experimental Farms, at Ottawa, who made this contribution is now a resident of Toronto. Dr. Saunder's health has not been very vigorous for some years and he has been taking life leisurely as he is well entitled to do.

We thought it fitting that the story of Marquis Wheat should be included in this publication and as Dr. Saunders has always very modestly refrained from writing any stories about Marquis himself, we arranged for the well known agricultural journalist, W. L. Smith to interview him as follows:—

Heredity or environment, that stock subject for amateur debaters, is not a question at issue so far as Dr. Chas. E. Saunders is concerned. The creator of Marquis wheat owes something of the talent which has made it possible for him to render the wonderful service he has rendered to Canadian Agriculture to both of the influences mentioned. Dr. Charles E. Saunders is the son of Dr. Wm. Saunders, the first director of Dominion Ex-

perimental Farms, and the early manhood of Dr. Saunders the second was spent in an atmosphere of investigation and experiment.

Dr. William Saunders became head of the Dominion Experimental Farms in 1887, and his son, Dr. Charles E. Saunders, officially entered the service in 1903. The son had, however, been semi-officially connected with the father's work for some time before the date last mentioned and it was to work done before his permanent appointment that the appointment itself was due. Almost from the beginning of his service as Director of Dominion Experimental Farms, Dr. Wm. Saunders began creating new varieties of wheat by crossing and selection. Creating a new variety of grain by crossing is a simple thing. It is comparatively simple to make rough selections from such crosses. To determine the value of these crosses and selections required long and patient study.

"There was no one on the staff of the Experimental Farms with the time available to make that study twenty-six years ago." Dr. Charles Saunders told me, "and that is why I was appointed for the purpose in 1903. When I took charge there were a large number of crosses and selections, the result of my father's work, to begin upon. Red Fife formed part of the parentage of almost all of these crosses, the object being to discover for use in Western Canada an earlier maturing grain than Fife but one with equal milling quality. In testing the value of these crosses I began by chewing the grain to determine the elasticity of the gummy substance produced. I believe, in carrying on that work, I made more wheat into gum than was made by all the boys in any dozen rural schools of a generation ago. Hundreds and hundreds of heads, gathered at harvest time, were tried out in this way in the following Winter. Of course, even the heads themselves had been roughly selected in the field but the first real test for quality was performed by chewing. It was in this way that Marquis was, in the Winter of 1903-4, first selected for further experiments. Two years were next spent in propagation and then the second stage began. This was in the form of work to determine the milling and baking qualities of the new wheat. For this purpose I had miniature milling and baking plants of my own. I ground my own flour and baked my own bread. In

order to ensure accuracy the most scrupulous care was taken to avoid waste, and the heat in the fermenting cupboard was regulated by a thermostat. Many other varieties of wheat were used for purposes of comparison and in all these comparative tests Marquis came out triumphant showing a difference in its favor in volume of bread produced of 50% to 75% over the poorest sorts.

"This second point settled, I at once set about providing for propagation in a larger way and, as a start, 23 lbs. of the new wheat were sent to the Dominion Experimental Farm at Indian Head in 1907. Another lot was sent to Brandon Farm, 1908-9. From that time on, progress was meteoric, the rapidity with which Marquis spread over the West being greatly facilitated by the unfavorable seasons of 1907 and 1908, seasons in which there were heavy losses by freezing in older varieties, but seasons in which Marquis came through with flying colors simply because, in Western Canada, it will mature in a week to ten days less than will varieties previously in use."

Small lots of Marquis seed were distributed to individual Western farmers, as early as 1909 and in 1912 it was available through commercial channels. To-day, it is conservatively estimated that 80% of the wheat grown on the prairies of the Canadian west is the progeny of the seed first produced and tested by Dr. Charles E. Saunders at the Central Experimental Farm, Ottawa. What has Marquis done for Canadian prairie agriculture? It has not only increased the yield per acre, but it has in the areas first settled reduced the danger of serious loss by frost damage from once in every other year to once in twelve years. What does that mean in dollars? The father of Marquis would not say, but conservative and qualified authorities place the benefit to Western Agriculture at anywhere from twenty to seventy-five million dollars per Summer.

But Marquis is not the only wheat that Dr. Charles E. Saunders has given to Canada. By experiments and investigations similar to those that preceded the creation of Marquis, the same wheat wizard has given us Prelude, Garnet and Reward. Prelude is two to three weeks earlier than Marquis in ripening out, like Garnet, it produces a dark flour. Reward, a cross between Prelude and Marquis, has something of the earliness of

Prelude and the milling and other qualities of Marquis. "It looks to me," Dr. Saunders said, "as if Reward may yet prove a dangerous rival to Marquis, particularly in those parts of the West where frost danger is greatest. In fact it was with the Reward as you know that Herman Trelle won the sweepstakes at the last Royal Winter Fair."

Even this does not end the story of the beneficial activities of Dr. Saunders. Before quitting his period of service at Ottawa, he had commenced still further experiments in crossing and selection, but was not long enough at this work to carry these to conclusion. Reward, Prelude and Garnet, however, as well as Marquis represent his finished work.

Just a word in conclusion about the work of the first Dr. Saunders. Numberless and valuable experiments were carried out by the first Director of the Federal Experimental Farm System in addition to the preliminary work in wheat which culminated in Marquis and Reward. Among other work, by crossing wild Siberian crab-apples with the hardiest Canadian sorts, he produced a number of new crab-apples that are hardy and will mature in almost any part of the Canadian West. But one of his most successful experiments resulted in the introduction into Western Canada of the Caragana obtained from Siberia. This beautiful and hardy shrub, beautiful both in flower, leaf and shape, is now seen in long lines of hedges and plots all over the far flung prairies of the West. Saunders the younger has made two bushels of wheat to grow where one grew before. Saunders the elder has given beauty and shade to what would otherwise be a bald and disheartening scene of wideflung land without shade or beauty. And countless generations yet unborn will have cause to revere the memory of two men to whom that well remembered phrase applies in overflowing measure—"They have done the State some service".

Chapter VII

SUCCULENT FEEDS

THERE is a long Winter feeding period for live stock in Canada when grazing is out of the question. In order to keep stock as nearly as possible in a natural condition it is necessary to have feeds that are a good substitute for grass, as when live stock is Wintered on dry fodder it loses that sappiness, so much desired by feeders, and so necessary that the animals shall thrive.

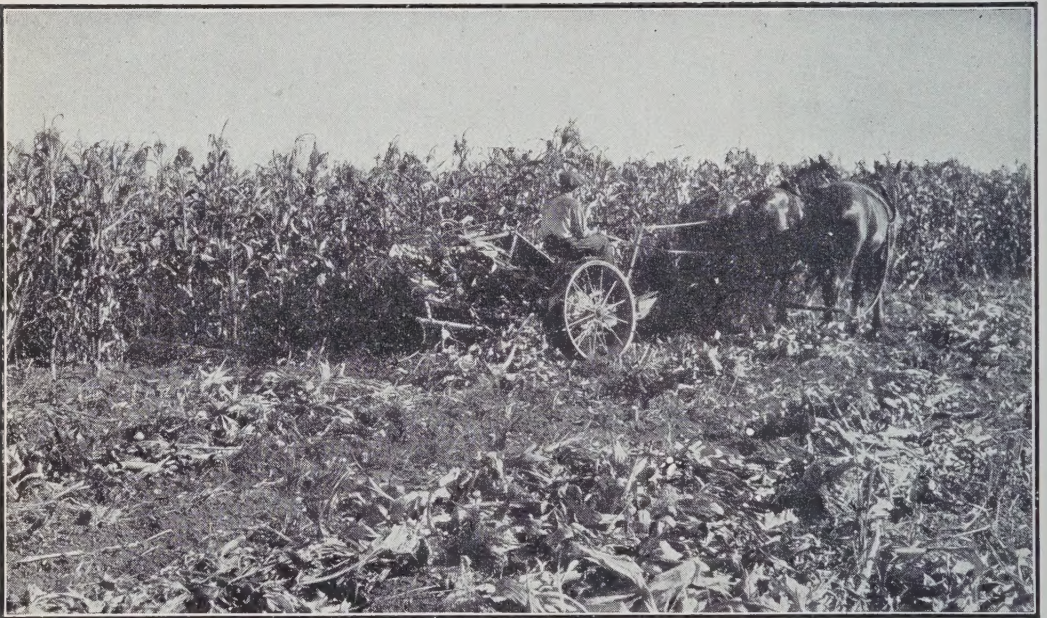
This makes it almost imperative that roots or ensilage shall be produced for Winter feeding. Ensilaging green crops for Winter feeding is one of the most forward moves made in agriculture during the past half century. Growing and storing roots has formed an important feature of British livestock farming for over two centuries. Without succulent feeds the feeding of dairy cows, raising of calves, in fact the feeding of all livestock through the Winter would be very difficult.

Making For many years, in Ontario, corn was considered to
Ensilage be the only satisfactory crop to put in a silo and it is still a very useful crop for that purpose. The yield per acre from good fodder corn is larger than that from any other green crop and the ensilage made from it has a very high feeding value, especially if it is a variety that produces well matured ears, and farmers who have the facilities for handling it, especially if they have a number of silos to fill, will find it a profitable crop to make silage of. Corn is a hoe crop and if it is kept well cultivated is a good means of cleaning the land, and if the corn field is well manured it is in fairly good condition for the next crop.

Among the reasons against corn for ensilage is that it is a heavy crop to handle. There is a good deal of work cultivating and hoeing it at a time when there is plenty of work pushing the farmer. You require a corn binder to cut it, and as this is quite an expensive machine, the cost for a few day's work is very large. Sheaves of corn, if the crop is good, are very heavy and awkward to handle and it requires a great deal of labor to haul

them to the barn and put them through the ensilage cutter. Filling a silo with corn ensilage is heavy work. If a farmer could get the use of a machine that cuts up the corn for the silo as it reaps it, filling it into a wagon tank from which it is put into the silo with a blower, it might help, but these machines are not in general use here yet.

Corn for ensilage requires to be grown upon fields that have been liberally fertilized as poor land will not produce a corn crop. A good many cattle feeders have been accustomed to using corn ensilage for years. It is a very satisfactory feed, and finding it so well suited to their purpose, they are likely to continue with it. It may be placed well toward the top of the ensilage list for feeding value per acre.



Cutting corn for ensilage on the Prairies

Sweet Clover The closest rival of corn for ensilage is Sweet
Ensilage Clover. For this purpose the mammoth white
blossom variety is grown so as to obtain as high
a yield per acre as possible. Sweet Clover can be grown upon

land that is in fair condition without the application of any fertilizer. It should be sown at the rate of about 18 to 20 lbs. per acre and it will smother out most weeds that may be in the field. It can be sown with a nurse crop of grain and the following year it is ready to harvest for ensilage.

Sweet Clover can be cut and put in the silo about haying time and so the work is out of the way. Besides it will enrich the land with nitrogen and its stubble can be plowed after the crop is removed and it makes a good field to seed with Fall wheat, the roots of the Sweet Clover having fertilized the soil for the wheat.

Sweet Clover does not yield quite as heavy as corn, but its ensilage is of about the same feeding value. It can be cut with an ordinary grain binder and the sheaves are not nearly so heavy to handle, and it requires no hoeing. Sweet Clover should be cut for ensilage as soon as the first blossoms begin to drop. It is well to watch it carefully as the stalks must not get brown at the roots and become too dry, nor must the clover be cut too green or you will have the sap running out of the silo in bucketfuls.

The Sweet Clover should be put into the silo as it is cut. On no account should it be allowed to wilt in the sun for a day after cutting. This ensilage should be well tramped in the silo, so as to squeeze out all the air and make a firm mass to cure.

Sweet Clover ensilage is very palatable and stock get very fond of it, which, as a matter of fact, they do of all silage.

Thos. McMillan, M.P., of Seaforth, Ont., one of the largest and most successful finishers of commercial feeding cattle in the whole of Canada, has abandoned corn for ensilage and grows Sweet Clover entirely. He has yields running ten and twelve tons per acre and says, on the labor score alone, he would not go back to growing corn. Besides, he says, the Sweet Clover fits in better with his cropping plans.

W. A. Dryden, of Brooklin, Ont., breeder of pure bred Short-horns, uses both Sweet Clover and corn for ensilage and is inclined to favor the Sweet Clover, though he is not ready to abandon corn.

Sunflowers for Ensilage In the Western prairies sunflowers have become quite a favored ensilage crop during the past ten years. The late Geo. H. Hutton, of the C.P.R. Natural Resources Dept., at Calgary, was a strong exponent of



*Sunflowers for ensilage at the Olds, Alberta, School of Agriculture.
Principal F. S. Grisdale in the foreground*

the value of sunflowers as a silage crop and was responsible, in a great degree, for their popular adoption. In some of the dry areas this has been a most satisfactory crop and has added substantially to the available feed for cattle. In fact, in certain western sections, it is almost the only method by which any quantity of succulent feed for cattle can be laid by for Winter feeding. In some cases both corn and sunflowers are grown, sometimes as a mixed crop.

If planted together, in alternate rows the corn gives variety to the ensilage, and the sunflowers give bulk, the whole making very good feed. The great value of putting such a crop in a silo is that all of it is rendered palatable to the cattle, even the heaviest stalks of the sunflowers.

Sunflowers must not be put in the silo too early or the juice will almost produce a flood in the barn yard. If it is found to be leaking too much juice, a good plan is to have some green oats in stooks ready to mix with it and so absorb the juice and also improve the silage.

Green Oats On the black lands in Western Canada green oats is a very satisfactory silage crop. The yield is not as heavy as sunflowers but the quality of the ensilage is better and it is a very easily handled crop. It is necessary to grow the oats on land that gives a very rank growth. We have seen eight tons of green oats cut into a silo off a measured acre of land, and the ensilage was of a very high quality.

On this black loam the seeding should be very heavy, sowing $2\frac{1}{2}$ bushels per acre with the drill first and then repeating by crossing the field and sowing another $2\frac{1}{2}$ bushels per acre. This will make a wonderful stand when the rainfall is reasonably good, as the oats will grow fully six feet high.

If a crop of green oats of this kind is left until the grain gets well on into the dough there will still be plenty of sap in the stalks to make the whole mass into excellent ensilage and the grain will add substantially to its feeding value. Green oats sheaves are heavy, but they are not nearly so cumbersome to handle as sunflowers, or a heavy crop of corn.

Peas have been sometimes mixed with oats for this purpose, but on black prairie land they are not mature enough to add

much value to the feed, though they give variety to it. If late oats and early ripening peas were mixed they would make better feed.

When filling the silo be certain there is juice enough to "make" the ensilage. Frequently a farmer is delayed in filling his silo and the silage crop is a trifle too dry. Watch this carefully and if there is not juice enough in the crop be sure to add water. A hose running a small stream on the sheaves as they are fed into the cutting box is the best plan. If you haven't a water system place a barrel or large can above the box and have the water running out of it in a very small stream onto the sheaves as they go through. Throwing water by pailfuls into the silo is a bad plan as it is not evenly distributed over the feed.

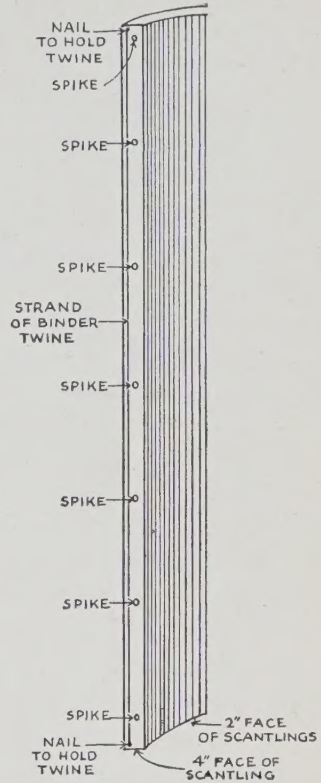
The cut feed, as it goes into the silo, should be quite damp with enough free juice to come out slightly at the bottom or between the staves.

If cut feed is put into a silo too dry, it will not cure but will mildew and you will have a lot of spoiled feed, and the mildew is apt to prove injurious to the animals to which it is fed. It is not well to have ensilage too sloppy but it is much better too wet than too dry. Watch your corn in this respect, if it has been frozen, as then it is apt to lack in moisture.

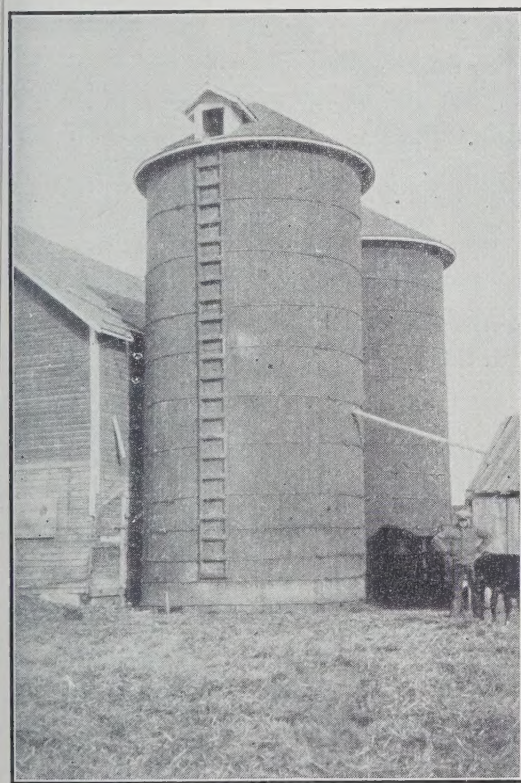
Silo Construction Most farmers are familiar with stave and cement silos as they have been built in their neighborhoods, and many bulletins have been published describing their construction. Pit silos are recommended where the expense of the other kind is too great. This means a trench dug in the ground, preferably in a side hill, and they have served a good turn. There is a cheaply constructed silo that a farmer can build, however, about which little has been published. A few of these silos were built near Olds, Alberta, some years ago and have proven very satisfactory.

This silo is built of two-by-four scantlings, either spruce or hemlock, of common grade. Good native spruce will answer well and can be bought cheaply. A round cement foundation can be put in by the farmer himself in the usual way. It is best to build this silo fifteen feet in diameter as the construction plan works at this dimension. The height is a matter to be guided

by the capacity you desire. The two-by-fours are stood on end with the dressed two-inch edge toward the inside of the silo. This need be the only dressed face on the material. The thickness of your wall will be 4 inches, or the width of the scantling. The pieces of timber are spiked together using a spike every six feet or so to hold them, but before a piece is spiked on to the next one, a strand of binder twine is stretched along the side of this upright scantling, about half an inch from its outer edge, with a tack in each end of it to hold it in place.



This illustrates the method of constructing a silo with two-by-four scantlings, stretching a strand of binder twine on each piece of timber to bring the wall into a circular form, and spiking scantlings on until the circle is completed from one door jamb around to the other. The space for the doors should be about 2 ft. 6 ins. wide and be a continuous opening from the bottom to the top of the silo. Iron rods should be put in to hold the door jambs rigidly in their place and these rods will do for a ladder to climb to the top to put down feed.



Silos built of common cedar scantlings on farm of Thos. McKercher, Olds, Alberta.

Then spike on the next scantling and follow this plan until the complete silo walls are built. The thickness of this strand of binder twine will separate the outer edges of the timbers enough to make a rounded wall of them. You can easily vary it some, if you find it curving too much or too little on the cement foundation, by tacking the twine, further from, or nearer to, the outside edge of the scantling, or if necessary omitting an occasional strand. If the silo is higher than the length of the scantlings, be sure to break your joints as you spike them on. The timbers forming the frames for your doors will be built as in a stave silo, and just about the same number of hoops put on it. This silo stands alone when spiked up and it is very easy to put on the hoops and adjust them. They should be screwed up tight.

One great advantage this silo has over one of staves is that it doesn't dry out and almost fall to pieces. The hoops need very little adjusting, and you have a solid four-inch wall not so much affected by winds. Common timber can be used, as knot holes the four-inch way in two-by-fours are unusual. This is a cheap silo any farmer can build and is a most substantial one when up. Give it a coat of paint.

Root Crops If your land is at all suitable for growing roots and you are engaged in livestock farming, you should not fail to have some mangels or turnips, or both. There is nothing that will quite take the place of roots for young stock. You may have other succulent feed for winter, but a root cellar full of "Swedes," with some mangels for later feeding in the Spring, will keep your young stock in better health than anything else you can feed. Don't let the fact that you have a silo prevent your having a few roots as well.

The growing of roots entails a good deal of labor, but if you have a field infested with weeds, this is an excellent way of cleaning it. The area of your root crop will have to be planned according to the help you have for hoeing and thinning, but even if you are limited to half an acre, and you prepare your land so as to get a good heavy crop, you will be surprised at what it will do for the stock during the Winter.

Good for All Livestock Work horses, standing idle a good part of the time, should have a good big turnip or mangel given to them every day and it won't be difficult to see the results in their condition. Brood sows, wintering without heavy grain feeding, will have their condition greatly improved by the addition of a few turnips or preferably mangels to their rations. Breeding ewes can have no better feed than a few turnips, and near lambing time it will be found to be excellent for them. Throw the hens a few turnips or mangels in the Winter when grass is out of sight; they will give you better results.

Turnips and mangels are prime cattle feed under all circumstances, and for young growing cattle once tried you would not be without them. Roots should be grown upon land where plenty of moisture is available. The deep, rich black loam of some parts of the prairies is excellent for turnips. They can be grown on light soil, if well manured from the barn yard, but sandy land is generally too dry. Turnips do well on fairly heavy soil if it is well cultivated to make a fine seed bed before the seed is planted.

If you are breeding a few pure bred cattle, grow some turnips and see the result in your calves. If you have a good supply of turnips and meal, you can wean pure bred calves without their losing any of the bloom produced by their milk diet. Young bulls, especially, will show results from liberal feeding of turnips after they are six to eight months old, and they are the most difficult animals to carry on from about that age until over eighteen months.

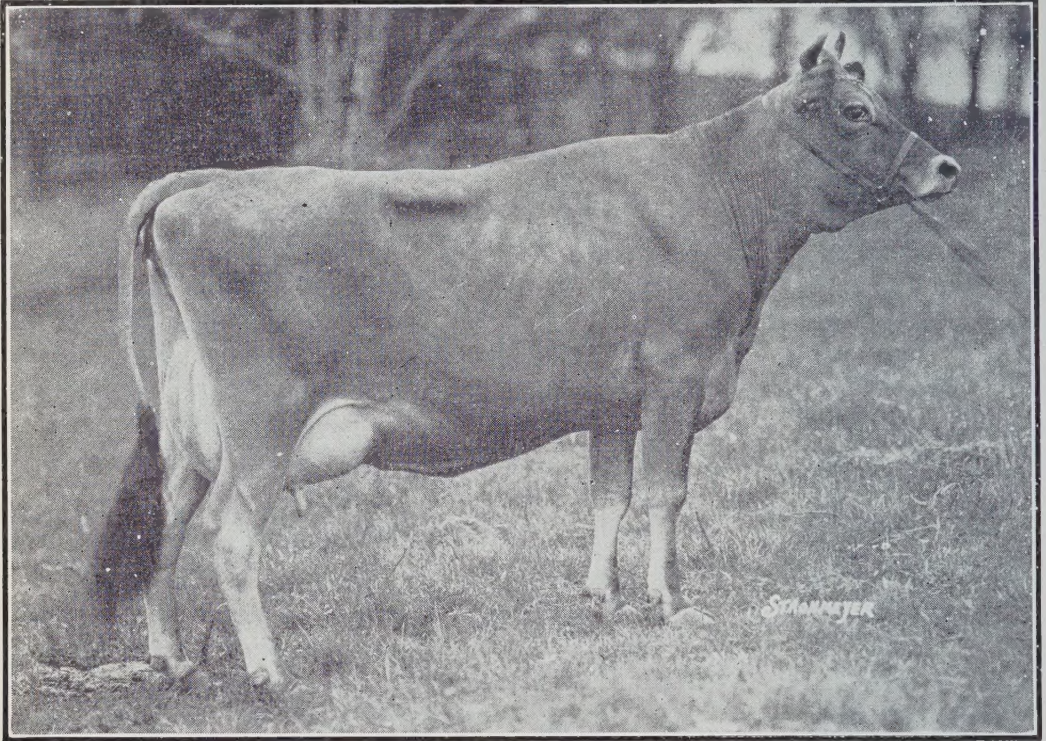
Suggestions and Observations A Scotch farmer whom I knew some years ago used to say that he could fatten steers on oat straw and turnips, and the oat straw badly threshed at that. As a matter of fact, he top-threshed the oat sheaves with a flail and gave the steers what was left. Without the turnips, however, he would not have had such success.

In Western Canada, where moisture is not too abundant, turnips do better sown on the level than in drills made with a plow. They are a little more difficult to thin this way, but the results will easily pay for the labor.

If you haven't a turnip drill to sow them, your grain drill will answer, closing up the spouts so as to make your drills three feet

apart. If you have a grass seed box on the drill, use it by conducting the seed from the small spouts on it into the hose so it will be planted and covered.

Scuffle your turnips as soon as you can see the row of green leaves appearing. This cultivation conserves moisture and destroys weeds. If you have small teeth, like a harrow, for your scuffer, they are much better for this work.



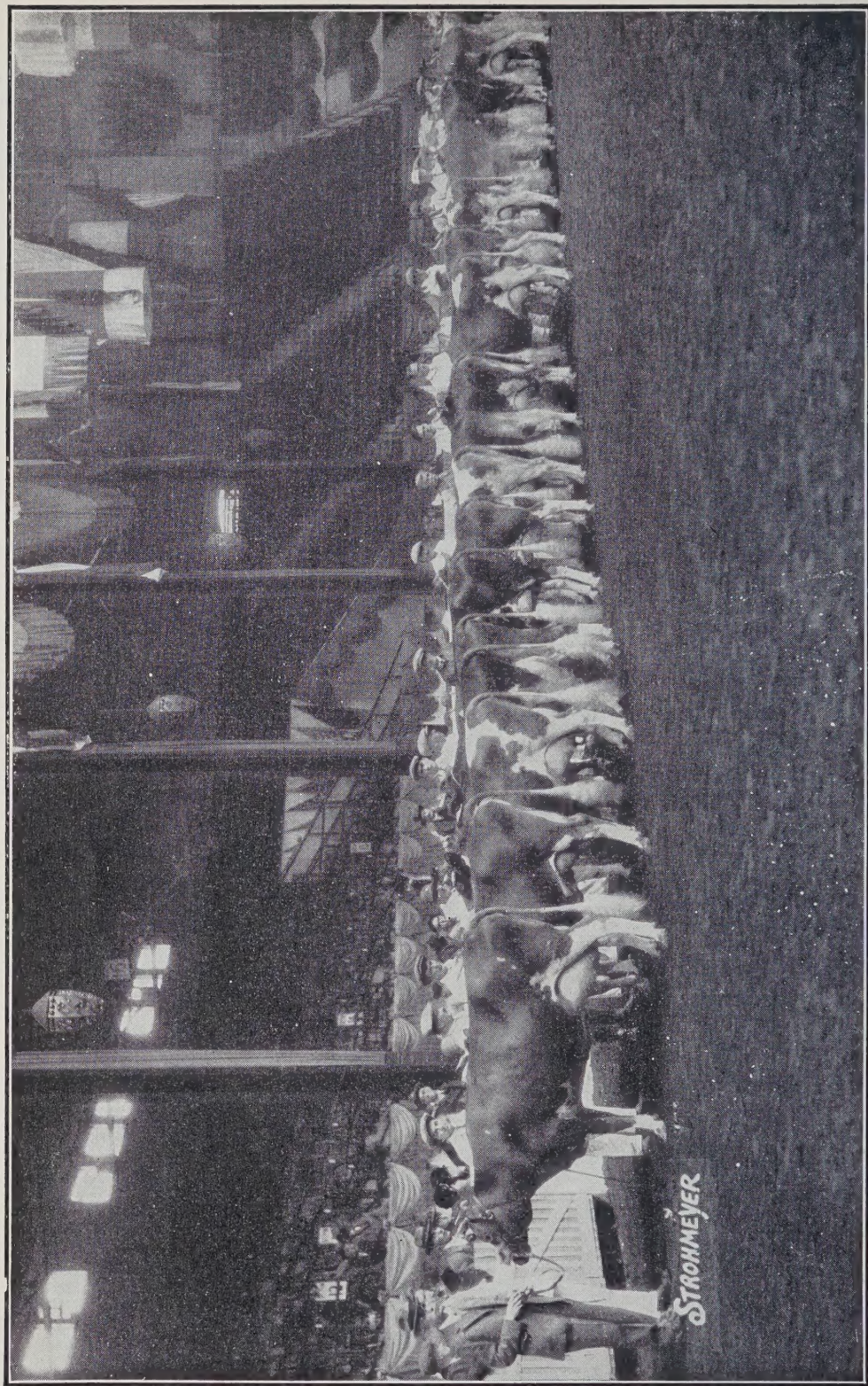
*Brampton Excellent Paxie with a Canadian record for milk and butter.
Imported by B. H. Bull & Sons, Brampton, Ont. Sold for \$7,500*

In the nineties a young college graduate was speaking at a Farmers' Institute Meeting in Pickering township, Ontario County. His topic was "Feeds," and as he proceeded he remarked upon the fact that turnips lacked in feeding value because when chemically analyzed they showed over 90% water. A practical farmer and cattle feeder, at the meeting, shook his whiskers and remarked, "Yes, my son, but it's mighty good water!"

Practical farm experience is a very necessary supplement to a scientific knowledge in agriculture.

You will find turnips, or mangels if you prefer the latter, the best water your stock ever got.

Storing Mangels must be harvested earlier than turnips as
Roots severe frosts will injure them, while turnips will stand
Autumn frosts and grow to a later date. If you have
no root house, keep them in pits and they will be even fresher
and better. In Western Canada, build two rough board walls,
or they may be made with woven fence wire on posts, about
two or three feet apart, along the sides and across one end of
your space for the pit. Tramp straw into the space between
these walls, put in your roots, cover the top with poles or slabs
and then blow a straw stack over it, or haul eight or ten loads
of straw and cover it all completely. You have one end of your
pit or root cellar open to the loose straw and you can get the
turnips out there, but pile and tramp the straw back each time
after opening it. Whatever you do, have your pit **convenient**
to your place of feeding.



Prof. Barton, of Macdonald College, judging Guernseys at the
Royal Winter Fair, Toronto

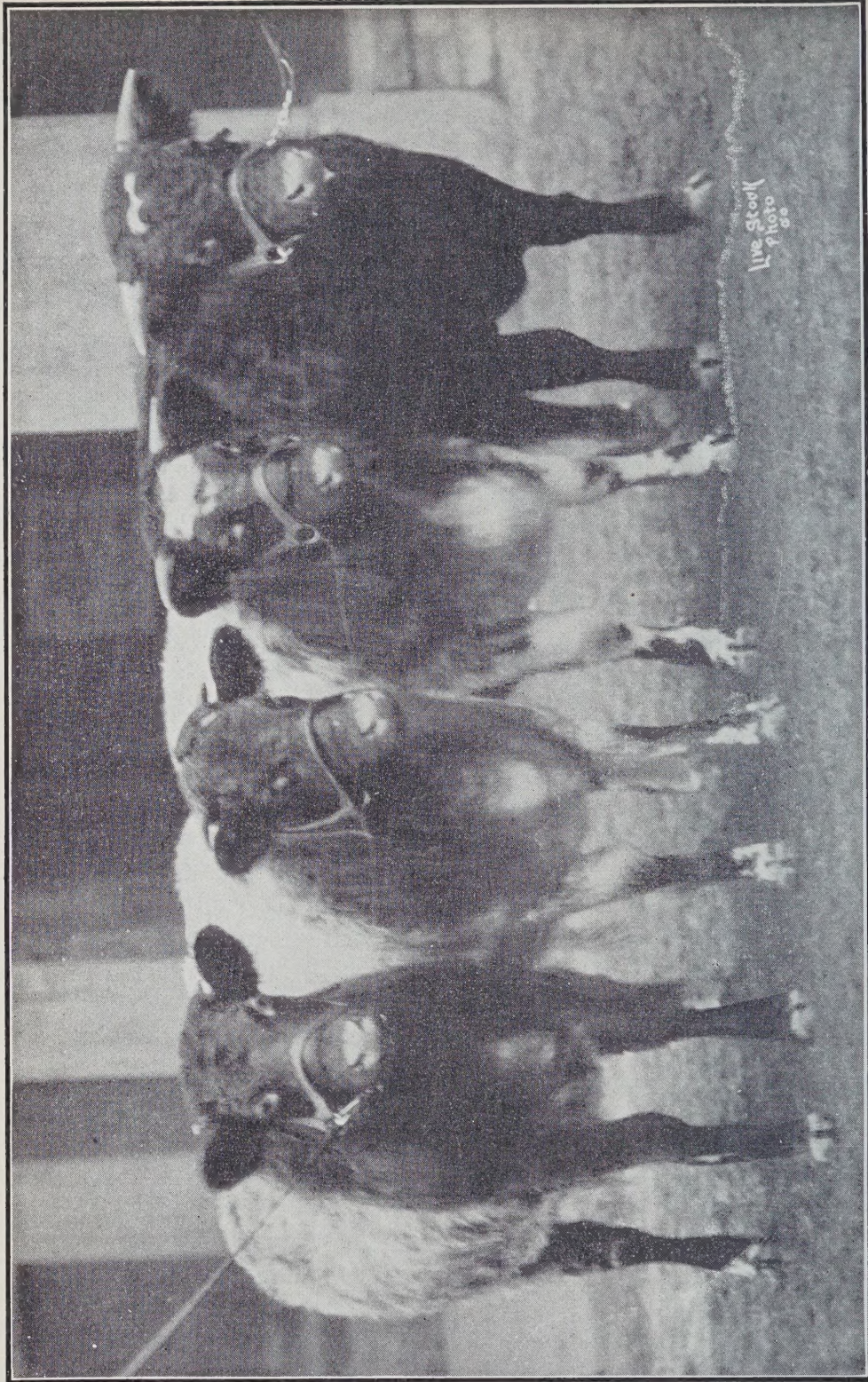
*Chapter VIII***ROTATION OF CROPS**

CRIPPING is done in a rotation that we may return to the soil as much as possible of the fertility exhausted by these crops. If a single crop is repeated year after year, unless large amounts of fertilizer are applied, the land soon gets in a run-down or worn-out condition. The objects of a crop rotation are, to improve the physical condition of the soil, maintain its humus content, conserve moisture, lessen the ravages of insect pests, help in the control of weeds, improve the yield of crops, and devise a plan that will systematize and distribute the farm work throughout the year.

A Common Rotation There are three common crops that figure in most rotations; a cultivated crop such as corn or roots, a grain crop and a grass crop. One well defined rotation in mixed farming, and particularly in dairy farming districts, has been to follow a grass or pasture with a grain crop, follow that with roots and corn, then another grain crop and seed to hay or pasture with this grain crop.

Fairly good results have been achieved by this plan. If a field is in hay or pasture, and clover has formed a large part of the grass, it should give a good crop of grain. The sod should be plowed in the Fall to give it every opportunity for rotting. If there is a fair length of grass on it when turned under, all the better. The sod will add fibre and vegetable matter to the soil and keep it in a good condition of tilth.

If roots and corn are planted in this field following the grain crop, it will naturally be well fertilized, as most of the barnyard manure goes on the corn and root ground in this plan of farming. It will also be well cultivated, and hoed at least twice, to kill all the weeds, so that in the following year you have a good clean field, with the residue of last year's fertilizer, to produce a bumper crop of grain. The field is now in good condition to seed to grass again with this grain crop. Land should not be seeded



*First prize Shorthorn get of sire group at the 1925 Chicago International Exhibition.
Bred and exhibited by James Douglas & Sons, Caledonia, Ont.*

to grass unless it is in good heart. Sometimes run-out land has been seeded to grass to give it a rest. This is folly as it will not grow good grass but simply produce weeds and come back out of the sod in a still worse condition. Put your land in good condition and then you can safely seed for one of your most important crops, grass. You will get a good "Catch" of clover on land that has been manured for corn and roots, and your fields will go on improving.

Legumes in Rotations The growing of Alfalfa and Sweet Clover has worked a good many changes in crop rotations.

These two plants might well be called the "chief legumes"; their ability to store nitrogen in the land being of such a marked character that they become soil improvers, and good forage crops, at the same time. With these clovers the rotation described might, with profit, be varied in this way: break a sod field, sowing it to mixed grain, barley, or oats, sow Sweet Clover with the grain crop, cut it for the silo the following year, or for hay, plow the Sweet Clover stubble and sow Fall wheat, follow the wheat with oats the next year and seed down to Alfalfa with the oat crop. If you get a good stand of Alfalfa it might be left for several years. This gives you a five-year rotation or a longer one when land is left in Alfalfa. The Sweet Clover fertilizes your land for the wheat crop, and also inoculates the soil for the Alfalfa seed. It would be profitable to sow commercial fertilizer with the oats, but from this you could eliminate the nitrogen, thus saving something in cost. A good mixture to use would be 0-12-4.

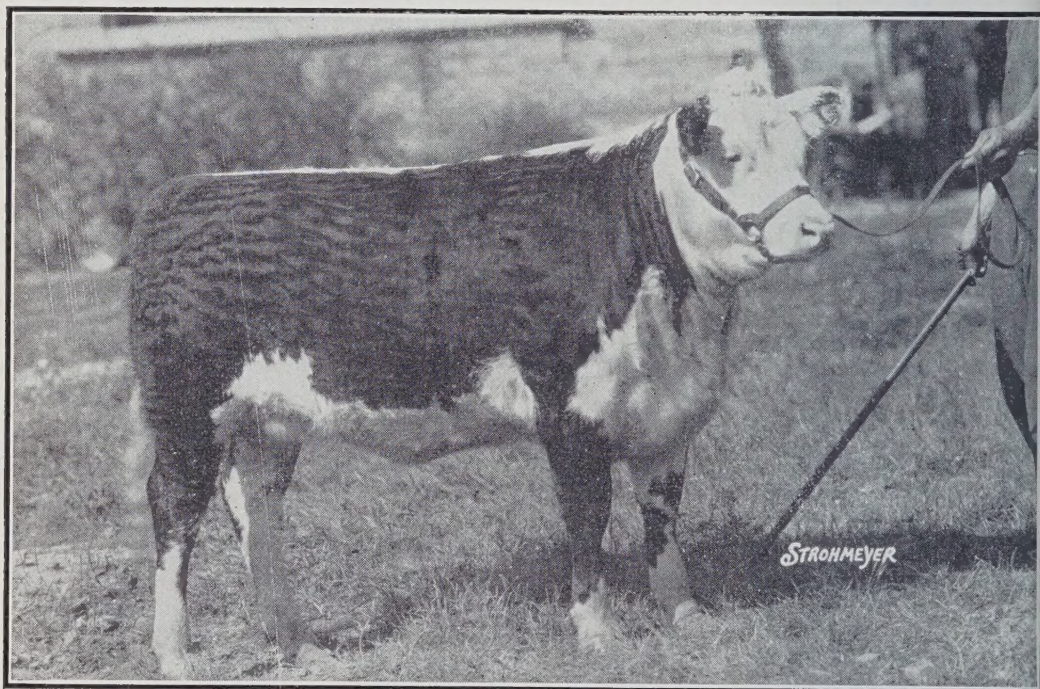
Legumes have been very beneficial in rotations by preventing a one-sided exhaustion of the soil which always results from continued grain cropping.

Western Canada The prairie provinces are so devoted to wheat growing, that in some localities the only recognized rotation consists of Summer fallow and a wheat crop, and the amount of available moisture determines whether there shall be one or two crops of wheat after each Summer fallowing.

There are areas, however, of deep black land where oats and barley do better than wheat until the land has been about ten

years under cultivation. This land and also that of the clay or so called "gumbo" belts does not seem to require much fertilizing or careful rotation to produce good crops. However, no matter how good your land is you cannot afford to give it anything but the very best treatment, and the better the land the greater will be the response to care.

It always pays better to seed only half the area and get twice as good a crop, and this can frequently be done, as the difference between careful and careless farming is often very great. Rich prairie land is a great temptation to the farmer to seed as much as he can and trust to a favorable season for results.

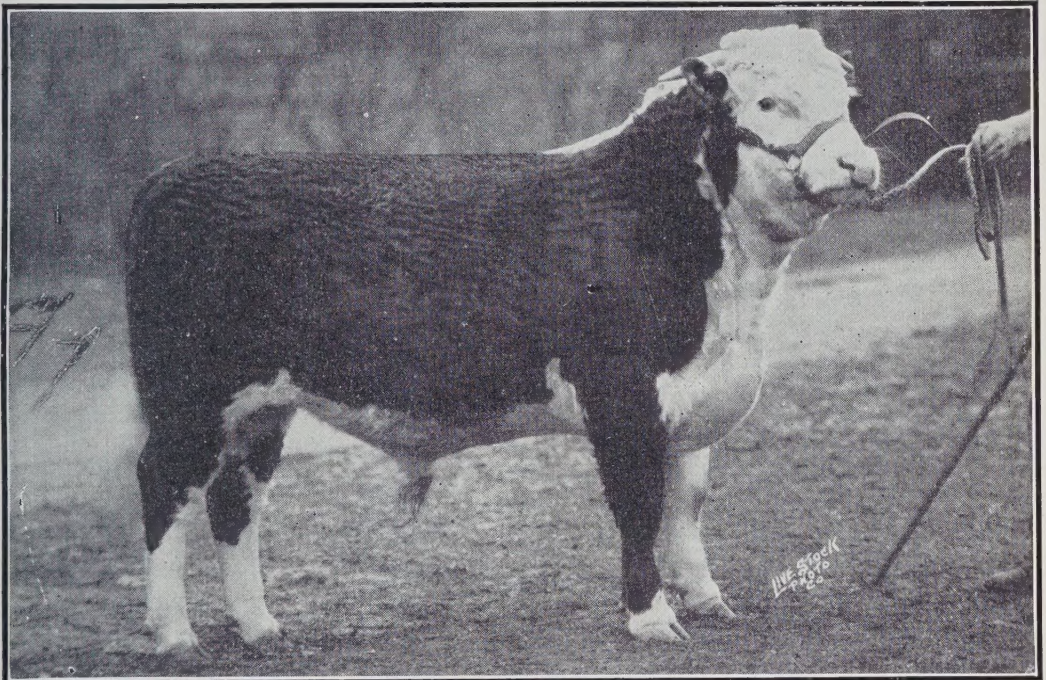


Alabama 5th. Junior and grand champion Hereford female for Mossom Boyd Co., Bobcaygeon, Ont., 1928 Royal Winter Fair

Rotations for Prairies The Dominion Experimental Farms have tried out quite a few rotations on the prairies, and as their farms are widely separated, and are located in districts greatly differing as to soil and rainfall, the results can be regarded as a fairly good guide.

Some of their rotations read: oats, Summer fallow, wheat, wheat and then the list repeated; barley or oats, hay, wheat, wheat, fallow and the list repeated; pasture sometimes follows the hay crop, which might improve the list.

In districts where Alfalfa will grow it figures as an important crop in any rotation, generally remaining down for a few years.



Lycian 3rd. Junior and grand champion Hereford bull at 1927 Royal Winter Fair for Mossom Boyd Co.

Sweet Clover Sweet Clover will play an important part in crop rotations in many prairie sections. Where soil drifting has set in, or weeds have overrun the fields, Sweet Clover will be a great help in cleaning up. It will grow even if the land is run down, though in many such cases inoculation will be necessary, and by plowing under a good crop of it, enough fibre will be added to the soil to reduce the tendency to drift.

Sweet Clover as a pasture will also work wonders in restoring fertility and getting the land into a better condition of tilth. It is doubtful if any other single crop can produce as good re-

sults as Sweet Clover on run down, weedy prairie land; and if some live stock are kept and a silo erected, its value will be greatly increased.

Mixed Farming Mixed farming simplifies the rotation problem, as it enables the farmer to use silage and other feed crops and so discontinue a plan of persistent grain cropping, and in some cases wheat cropping entirely. While wheat is at a good price, however, it is a strong temptation to the farmer as it is a cash crop. In this case he must determine how often it is necessary to Summer fallow to keep the weeds in check and retain the fertility of his soil. If he is a one crop farmer he needs to exercise greater care because of that, in order that his land may preserve its strength and usefulness. It is always necessary to put something back and to give land a rest from a one crop system. Common sense teaches us that, and the best judgment of the grain croppers must be used for the conservation of their soil.

*Chapter IX***PERMANENT PASTURE AND HAY**

FARMERS have not practised the laying down of permanent pastures in Canada, as has been done in Great Britain. It is only in a few sections of this country that you find pastures seeded with a view to keeping these fields exclusively for grazing purposes. Cattle men would find it a very good plan, however, as a pasture of this kind will not only feed more beasts, but the grass will be more nutritious than on pastures that form part of a three or four-year rotation of crops and are only grazed for one, or at the most, two years.

Essentials of a Good Pasture The requisites of a good pasture are that it begins its growth early in the Spring and continues it late in the Autumn. The feed must be both palatable and nutritious, and the yield generous. The turf or sod must be a close enough matt not to be easily injured by the tramping of animals, or close grazing, hence the necessity for a variety of grasses and heavy seeding.

A Good Mixture Several mixtures have been tried out for permanent pastures, and they vary with locality and conditions of soil, as certain grasses will do better in one place while others excel in another. The following mixture has been quite successful in parts of Ontario. Orchard grass 7 lbs., Alsike clover 3 lbs., Alfalfa 6 lbs., Tall Oat Grass 2 lbs., and Timothy 8 lbs. This will give a seeding of 26 lbs. to the acre and for a pasture it is not too thick. In fact a few pounds might be added to it. Grass on grazing lands should not be allowed to grow too rank or coarse, and if the field is seeded thickly there is less danger of this. In fact, all the requisites for a good pasture call for a generous supply of seed to produce it. In Aberdeenshire, Scotland, farmers often sow as much as 42 lbs. of seed to the acre for permanent pastures.

White Dutch Clover There is a White Dutch Clover, or common White Clover, as it is often called, which is indigenous to Ontario and parts of the West, particularly some districts in Alberta. This clover is an excellent pasture grass and will come on of its own accord if given the proper encouragement. An application of fertilizer will bring it along quickly, and even after the field has been fertilized by the cattle pasturing on it, you will notice the White Clover appearing.

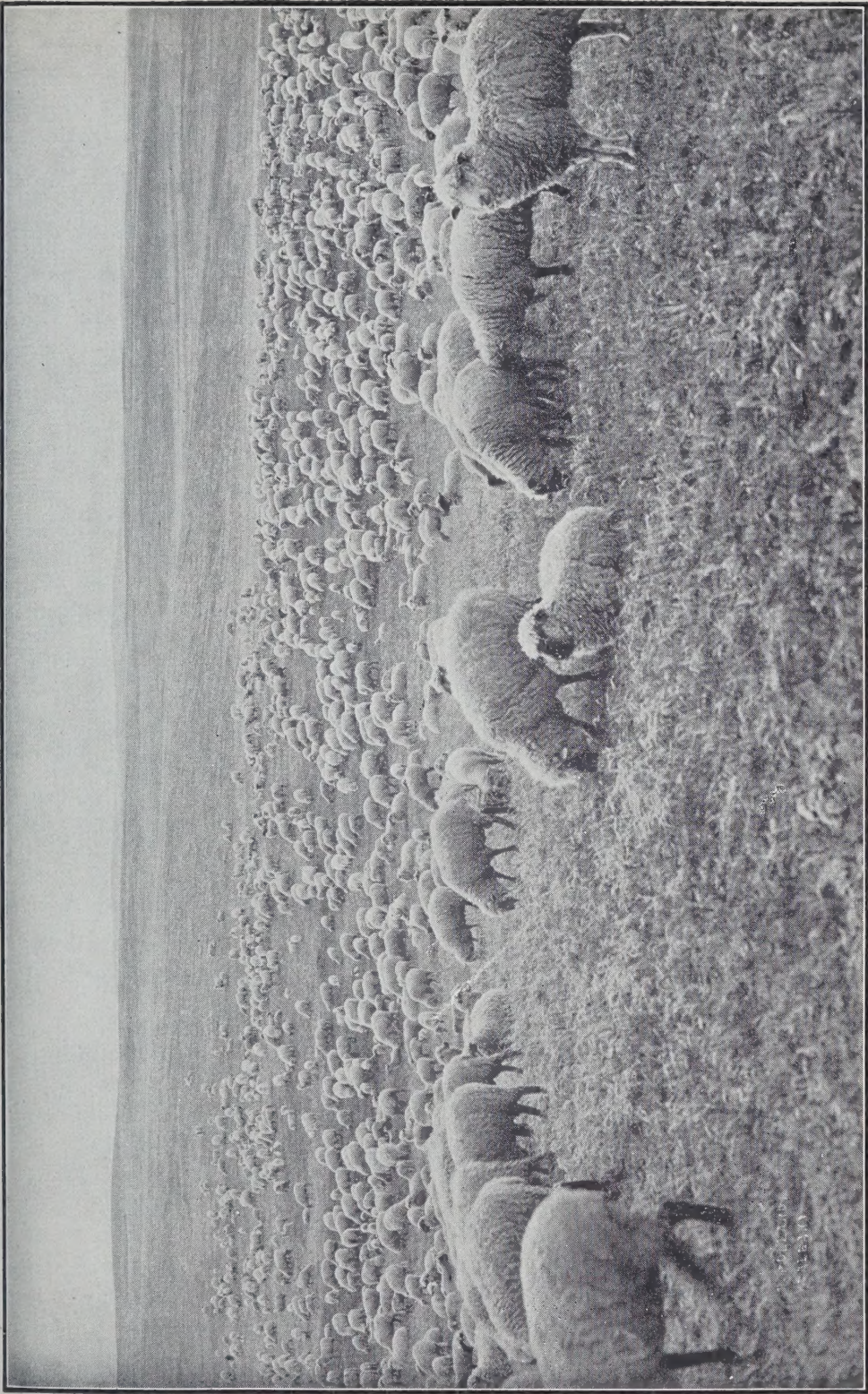
This clover can be helped on greatly, as can the rest of your pasture grasses, by the use of commercial fertilizer. This should be done at least every three or four years, and 0-12-2 is a good mixture for this purpose, sowing 400 or 500 lbs. per acre on the grass. A good time to apply it is in the early Spring before the cattle are turned on to the field, so the Spring rains will dissolve it and carry it to the grass roots.

Another Mixture Another pasture mixture used with good success is: Red Top 2 lbs., Meadow Fescue 5 lbs., Timothy 3 lbs., Orchard Grass 5 lbs., Tall Oat Grass 3 lbs., Alsike Clover 3 lbs., and Alfalfa 5 lbs. This mixture also totals 26 lbs. per acre.

Meadow Fescue Meadow Fescue, it will be noted has been added in this mixture. This is a grass which we think should be more used in Canada, especially in pastures. It will endure for a long period once it is established, and is a good drought resistant plant. Meadow Fescue is more palatable and nutritious than Timothy and is in every way admirably adapted to form a part of a pasture mixture.

Tall Oat Grass Tall Oat Grass forms a part of both these mixtures because it comes on first in the Spring and gives an early top to the pasture, which is very desirable.

White Dutch Clover is sometimes substituted for Alsike in the second mixture, but in a locality where the White Dutch is in the habit of coming of its own accord we recommend sowing the Alsike as it is likely to disappear about the time the Dutch Clover appears on the scene.



Sheep on Western Stock Ranch. Cluny, Alberta

Photo by H. Pollard, Calgary

Kentucky Blue Grass Kentucky Blue Grass has made a pasture record for itself in parts of the United States hard to excel. In some of the States it creeps in of its own accord, takes possession of pastures and makes luxurious grazing for all kinds of live stock. Kentucky Blue grows very well in central Alberta where it will take hold in good shape, but in parts of Ontario it does not seem to be successful. Blue Grass does not come on for a year or two after it is sown. Though it propagates itself by a running rootstalk, it is very fine and requires some time to become established. Once it gets a foothold, however, it will go ahead and take possession, crowding out even Brome Grass in its persistent thickening.

Kentucky Blue Grass must not be confused with Canadian Blue Grass or "June Grass" as it is familiarly called. These two grasses are much different as to their value, and also show a decided difference upon close examination. Canadian Blue Grass has stems that are flat and hard being almost solid and of a bluish green color. Kentucky Blue Grass grows taller, its stems are round and much softer, and are green in color turning yellow as the seed is ripening.

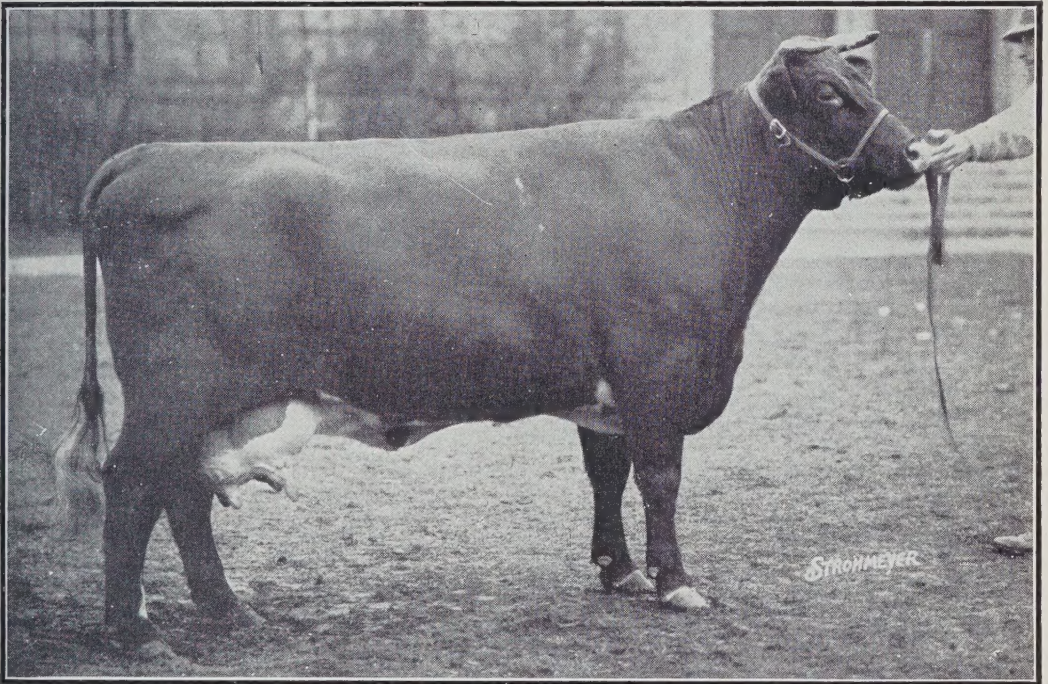
The seeds are also different. The Kentucky Blue Grass seeds are broadest at the centre and pointed, while the Canada Blue Grass seeds are broadest at one end and blunt. Canada Blue Grass will make a fair pasture on poor soil, but on good land, is a waste.

Red Top This is a grass that will grow on poor and acid soil, and if your field lacks in lime or has low wet spots you can count on Red Top coming on. It is not a grass of the first quality but is useful in a mixture, and if the field is not in as good tilth as it should be it will help out for a time. It is fairly nutritious, being about in a class with Timothy.

Timothy Timothy hay has always been in keen demand wherever horses are worked. In the old days livery stable keepers, and lumbermen who worked horses in the woods, would buy no other hay. It was their horse feed par excellence. Timothy has been lauded to the skies by its advocates, and denounced by others as no better than wheat straw. It was for

many years, however, the bulk of the hay crop on this continent. Its low protein content has caused sheep and cattle feeders to declare against it, and some of its opponents consider that its chief recommendation as horse feed is that it is so unpalatable that they will not eat too much of it and so not injure themselves as horses often do, by eating too much roughage.

Timothy is rarely cut early enough and so makes very fibrous feed. A good time to cut it is just when it comes in bloom. It will then make hay that is tender and easily digested. It is a good, vigorous grass, however, and when grown with Alsike, Alfalfa, or Red Clover makes good hay. It is generally included in most pasture mixtures. On much of the black prairie land Timothy grows luxuriously and unless mixed with other grasses is apt to be too rank in growth and to be coarse and woody.



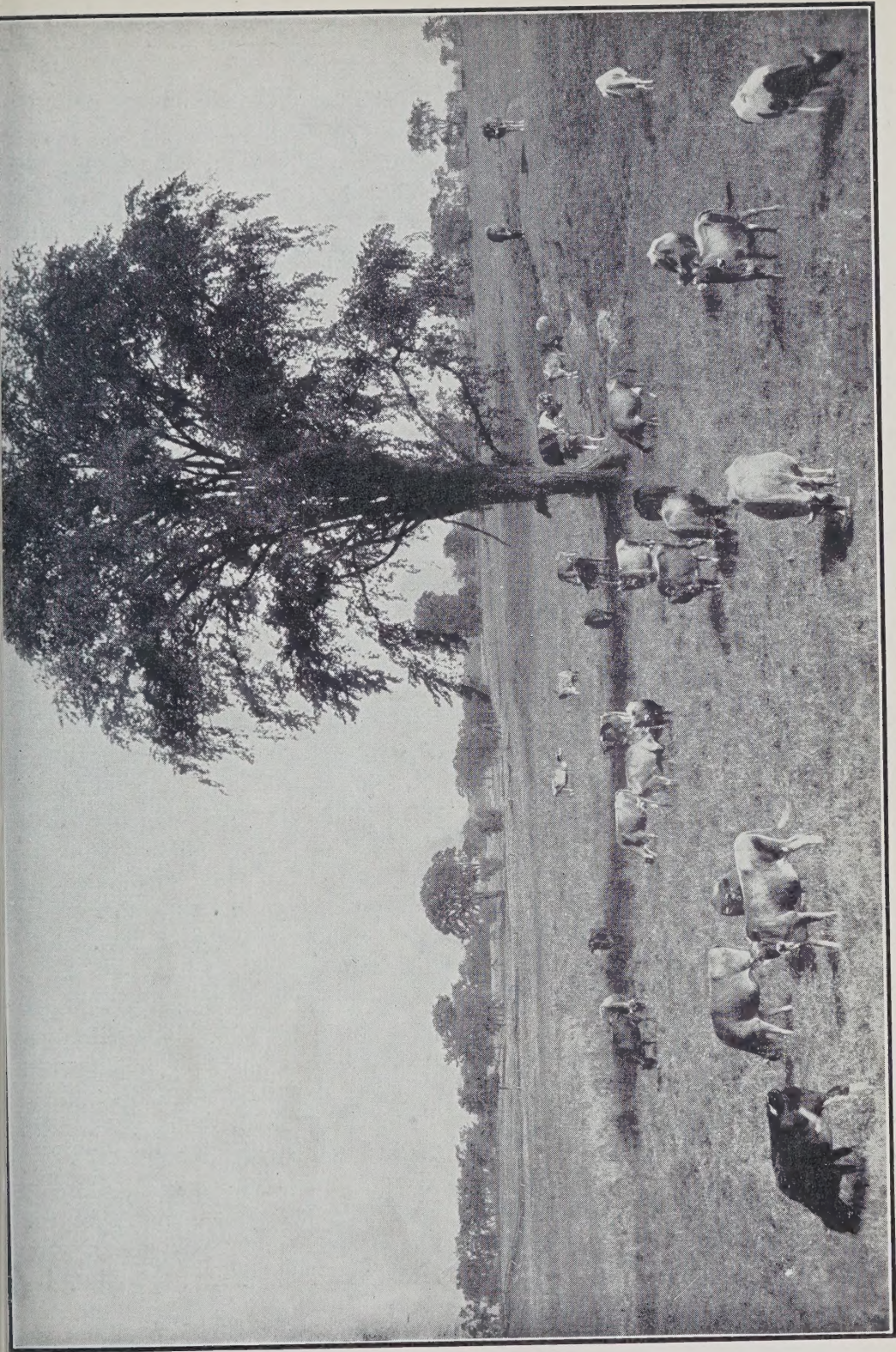
LaBelle Mimosa, grand champion, dual purpose Shorthorn cow. Royal Winter Fair 1928 owned by Alexander Maclaren, Buckingham, Quebec

Brome Grass Brome Grass makes very good pasture and also hay. If cut early it makes excellent feed for cattle, and is a fairly good diet for cows when clover is out of reach. The late George Lane had a good deal of Brome Grass in the pastures for his Percheron horses on the Bar U Ranch in Alberta, and it proved very satisfactory. Brome will grow in prairie districts where it is difficult to get other grasses to make any headway. One difficulty with it is that it has a very vigorous running rootstalk and so is troublesome to get out of the soil when you want to crop the land again. This running rootstalk also thickens the sod until it dwarfs the plants and the field gets into a "sod bound" condition. The remedy for this is to run a disc harrow over the sod, cutting it fairly deep, and it will not hurt to harrow afterwards. If the Brome is to remain down for some time it should be disced every second or third year.

It is rather remarkable that Brome Grass, in its native habitat, in Europe, does not have a running rootstalk but is simply a deep rooted perennial. It has developed this additional method of propagating itself mostly on the Western prairies.

One great drawback to Brome, in recent years, is the difficulty in getting seed free from Quack Grass, making it rather dangerous to seed to Brome. There is no grass that cattle will eat more eagerly in a pasture than Brome. They even prefer it to Blue Grass. A mixture of Brome and Blue Grass makes a very good pasture. They are both good drought resisting plants.

Western Rye Grass This is one of the best crops for hay on parts of the Western prairies. It is a hardy perennial, and will grow in comparatively dry areas. It is a bunch grass, and every prairie farmer knows the feeding value of bunch grass. It is really a hay plant but can be used for pasture though rather more effectively in mixtures. If used for hay it should be cut early, just as soon as the bloom begins to show, else it is likely to be woody. Mixtures recommended for Western pastures are combinations of Western Rye Grass, Brome, Timothy, Alfalfa and Kentucky Blue. In these one has to be guided by the soil and locality. Not less than 15 or 16 lbs. to the acre should be sown and of this 8 or 9 lbs. should be Western Rye. In very dry areas the largest part of the mixture should be Brome.



Jerseys in pasture at Brampton

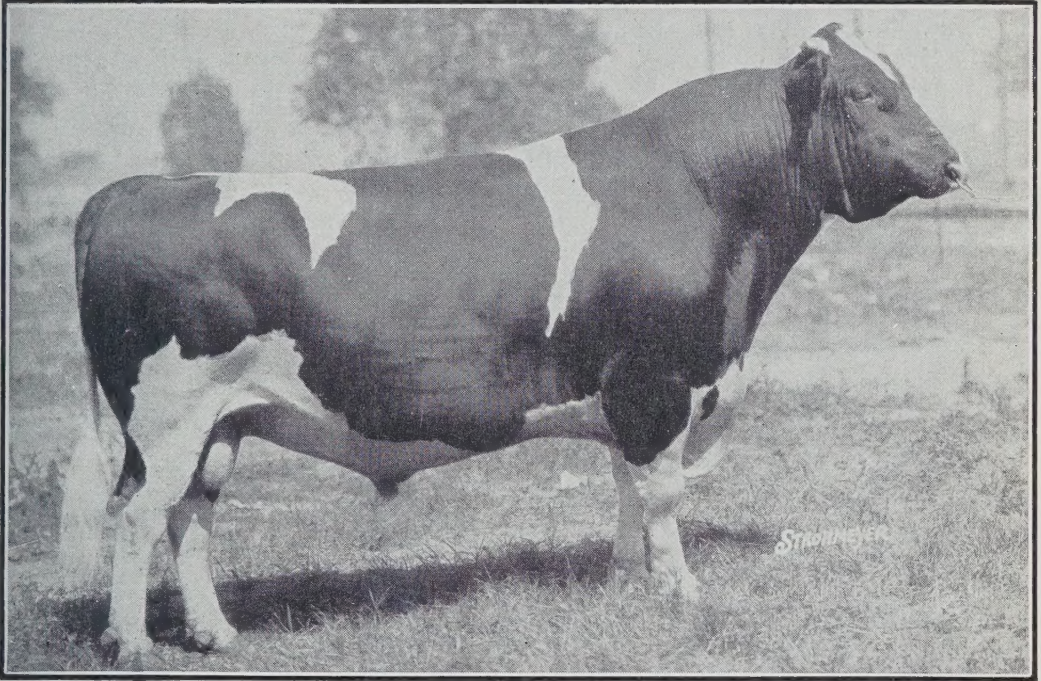
Care of Pasture The most important time to take care of your pasture is in the early Spring. Give it a chance to get a fair start before you turn the stock on it. To have the first young shoots clipped off, just as the grass is making an effort to recover from its dormant Winter condition and spring into new life, is very hard on it, and is an unprofitable way to treat it. Hold the cattle off for another week and it will reward you.

Feeding on Pasture The feeding of grain and cake on pastures is profitable in two ways. It aids greatly in fattening the cattle, and the manure dropped is so enriched as to decidedly improve the pasture. If weeds come up in a pasture and you have not got sheep to eat them be sure to cut them with the mower, (with the bar set high to miss the grass) and cut them before they have any chance of going to seed. Pastures should not be grazed off too closely at any time, especially in hot weather.

Alfalfa Alfalfa has been called the queen of all forage plants. In food values it is richer than any other clover or grass grown. It is the most palatable of all green feed and its leaves are said to be the equal of wheat middlings for dairy cows. It is food for cattle, sheep and hogs, horses do well on occasional feeds of it, and when ground, poultry thrive on it. In some climates, it can be cut three and four times in a season and always at least twice, so it is a heavier yielder of rich feed than all its competitors. It will not grow, however, on impoverished or badly drained soil, so you must be a reasonably good farmer to grow Alfalfa. It revels in rich well-drained clay soils.

Deep Roots, Long Life Alfalfa has a large, deeply penetrating root, which branches out, forming a net work that opens up heavy clay land and renders it more friable and so reduces labor in cultivation. Alfalfa is a perennial legume that will remain in the soil and maintain its growth for many years. On one of the Gardhouse farms in Etobicoke Township, York County, a field of Alfalfa yielded crops for thirty-two consecutive years. This clover has been grown for centuries, but it is only during the last half century that its

real value has been recognized. It was known for years in Europe as "Lucerne" and is still sometimes called by this name.



*Abbekerk Sylvius Lad, a prize-winning Holstein bull
owned by J. W. Innes, Woodstock, Ont.*

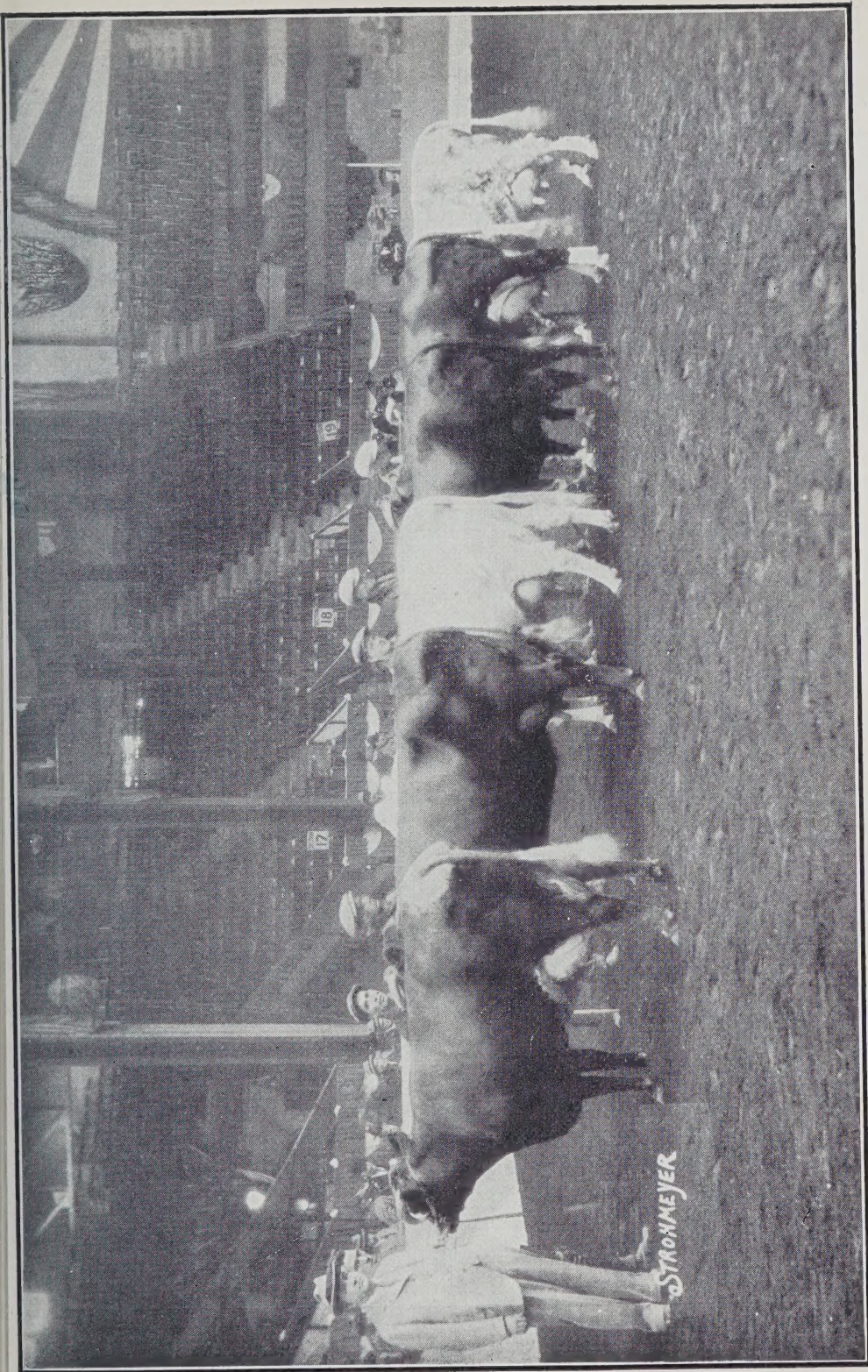
Should be Inoculated As a rule, Alfalfa seed should be inoculated when introduced to a new field. In some districts, it grows readily without, but where it starts in a thin, straggly manner, inoculation is necessary. The simplest and best method of inoculation is to get a quantity of earth from a good Alfalfa or Sweet Clover field and sow it on the land you wish to seed. Cultures can be obtained from Agricultural Colleges and Experimental Farms with which to inoculate the seed, but the use of culture is not so simple as the other plan. Sweet Clover will grow almost anywhere, except where there is an absence of lime, and a good plan to give Alfalfa a first rate start is to plow in a crop of Sweet Clover and then sow Alfalfa, in which case the inoculation is done as well as the land enriched.

Alfalfa as Pasture Dairy farmers and breeders of pure-bred cattle are finding an excellent late Summer pasture in the second crop of Alfalfa. It comes on at a time of year when the other pastures are apt to be eaten off or dried up, and the advantage of turning a bunch of cows into a knee-deep Alfalfa pasture, when their milk supply, either for the dairy, or for lusty pure-bred calves, is beginning to wane, can easily be surmised. If calves are following cows, the Alfalfa gives the youngsters just about the kind of additional nourishment they need.

This is also good treatment for the Alfalfa. It will go into the Winter with a good top to protect the crowns, and there is the additional advantage of fertilization from the manure of the cattle. Alfalfa usually forms part of mixtures used for permanent pastures, where it adds variety and palatability as well as nutriment to the grazing.

Alfalfa Seed Growing Alfalfa seed has been a very profitable business in Canada where conditions were suitable for its production. In many localities it has not been a very certain crop, and in others a light yielder. Peel County has been the banner district in Ontario for Alfalfa seed. In 1926, this county produced fully 750,000 bushels of Alfalfa seed which, at a valuation of \$10 per bushel to the grower, made a substantial return to the farmers of this small county. As the total production of Alfalfa seed in 1926 was not over 1,000,000 bushels, it will be seen that this county played an important part in this valuable crop. Peel Alfalfa seed is well known all over Canada and the United States, and has been in very keen demand. Unfortunately for the past two seasons this crop has been an almost complete failure. Several reasons are advanced for this, but none of them seem quite conclusive.

In growing Alfalfa for seed, it is best to cut it for hay the first two years so it will thicken up and the plants will get firmly fixed in the soil. The best crop of seed is undoubtedly obtained from allowing it to ripen on the first growth of the year. Trying to get seed from the second cutting is a very uncertain business and the yield is not likely to be very heavy.



*Duncan Marshall, judging dual purpose Shorthorns at
Royal Winter Fair, Toronto*

Peel Alfalfa has yielded up to 15 bushels of seed to the acre, but 8 bushels is a good average yield and a very profitable crop. Producing a Seed crop from Alfalfa makes a heavy drain on the vitality of the plant, and as it is not cut until the seed is ripe, early in August, no attempt should be made at any further cutting that year, and the field would be better not pastured that Fall, unless it has a very vigorous growth and then pastured very light. Sheep should not be put on to eat it off bare.

The fact that Alfalfa seed has been a crop failure for two years need not discourage growers. Close observers have found this happening in most countries where it has been grown. A continuously successful crop is not easily, if ever, found and Alfalfa seed will again be an abundant crop in Ontario.

Alfalfa on the Prairies In the Western irrigation districts, Alfalfa has been an abundant crop for years. It seems to be exactly suited to the conditions there, and yields have been heavy, with little difficulty encountered in growing it. It has been a boon to the farming of Southern Alberta, where wheat growing has been the chief enterprise, as it gives a variety to the farm operations very necessary to continued success. Two and three crops of this forage are cut every year on the irrigated land so that the yield per acre runs up to five tons.

Outside the irrigation belt, Alfalfa is gradually becoming a successful crop. We remember some years ago hearing an Alfalfa enthusiast say that Alfalfa would grow anywhere, it was simply a case of educating the Alfalfa, and this appears to be true. The corn belt has been moved North hundreds of miles in the last forty years, and the best method of getting either corn or Alfalfa to grow in a new district is to spend some care and effort in getting either plant to produce some seed in that district, and this seed will almost be sure to thrive there.

Alfalfa has been a successful hay crop on the University Farm at Edmonton for ten years. It yields from two to three and a half tons to the acre from two cuttings. There is no reason why it will not be one of the chief forage crops throughout that district.

In the last six or seven years, the acreage under Alfalfa has more than doubled in Manitoba. Saskatchewan is producing

Alfalfa in increasing quantities and as its value is being recognized by prairie farmers, greater efforts are being made to grow it. The University of Saskatoon has been producing Alfalfa seed for quite a number of years.

Alfalfa has made a large and important contribution to Canadian Agriculture, and it is bound to play a still more important part in the future.

The most popular variety of Alfalfa is Grimm, and largely because it has been the most successful. Turkestan has done quite well and Ontario Variegated is very satisfactory and has a good many supporters. Grimm seed came originally from Germany and was named after Wendelin Grimm, an early German settler in Carver County, Minnesota, who introduced this variety to the North American continent. It has proven to be the hardiest and best all round Alfalfa plant for both Canada and the United States, and pure seed of the Grimm variety is always in keen demand.

Sweet Clover Sweet Clover is a native of Europe, as most clovers are, but it is widely naturalized on this continent and was, for many years, a roadside plant in the United States before its value to agriculture was recognized; in fact, in some States it was proscribed as a noxious weed. One of the first uses of Sweet Clover in the United States was as a bee pasture on waste land, and it proved a valuable honey producer.

It was in connection with the bee business that Sweet Clover was brought into Ontario. It may have been a roadside weed in some parts of the province at an earlier date, but it was in the nineties that Mr. D. A. Jones of Beeton, Ont., brought the first Sweet Clover seed to Canada. Mr. Jones was a leading apiarist and editor of the *Bee Journal*. The village in which he lived was called Clarksville and he had its name changed to "Beeton," and so interested was he in the honey making business that he was familiarly known throughout Central Ontario as "Bee" Jones. Mr. Jones had gone South to attend a "Bee" convention and saw some of these waste land pastures of Sweet Clover, for bees, and also learned that this plant was a high class honey producer.

Sensing in Sweet Clover an opportunity for the "busy bees" of his own district to further "improve each shining hour," he brought back with him a quantity of Sweet Clover seed and sowed it along the railway track and on the road side to make a pasture for the bees. In this act he did a great public service in giving Sweet Clover an early introduction into Canada, though for this act "Bee" Jones was reviled by many a farmer who feared this weed would get inside his fences and add to his agricultural worries. There are still farmers who regard Sweet Clover as a weed, but their number is growing gradually and satisfactorily less. Sweet Clover is considered now by many authorities as the best of the legumes. In the chapter on Summer fallowing will be found a description of how Sweet Clover enriches the soil with nitrogen, but the most valuable feature of this legume is that it will grow on poor and worn out soil, and will turn barren hillsides into luxurious pastures. The only land it will not grow upon is that which is deficient in lime, so if it fails in any field an application of lime will bring a heavy growth.

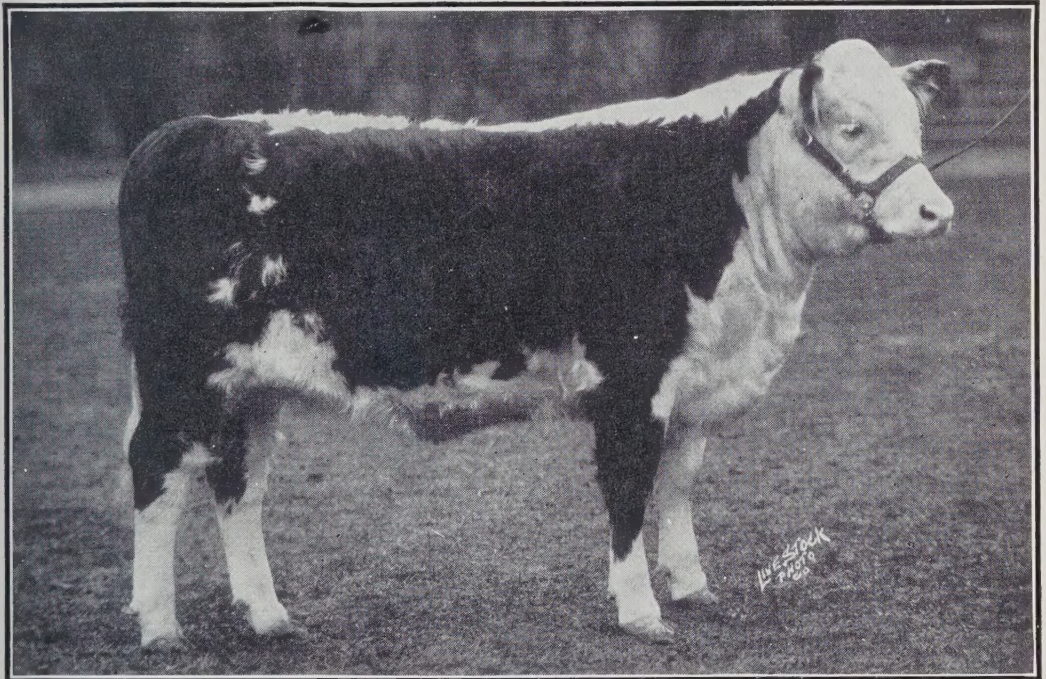
Sweet Clover makes a splendid pasture. Livestock may not at first like its somewhat bitter taste, but they soon learn to eat it and will do well on it. It makes good hay for sheep, is not excelled for ensilage, is a good smother crop for weeds, and



Farm power at pasture

is the greatest soil enricher of all the legumes. When used for hay, it should be cut early—as soon as the blossoms appear—so that the leaves may be saved and the stems will not get woody.

Sweet Clover rarely needs any inoculation of its seed to start its growth. It will come on of its own account. It is closely related to Alfalfa and thrives through the good offices of the same bacteria, consequently it will inoculate land for the growing of Alfalfa. It may be safely said that there is no better legume than Sweet Clover, and certainly there is none that can quite fill its place.



Glen Ion 16th, Junior champion Hereford female. at 1927 Royal Winter Fair for Mossom Boyd Co.

Varieties The first two varieties of Sweet Clover were the white and the yellow blossom. The yellow blossom was usually more persistent in staying in the land but did not grow so rank as the white blossom and was considered better for hay or pasture but not so valuable for plowing under, nor so heavy a yielder of green fodder for the silo.

A new variety has been developed known as the **Dwarf White** that is finer in the stems, has more leaves, and does not grow as woody as the original or Mammoth White. The Dwarf White is much the best of the three varieties for hay or pasture, while the Mammoth White is the only variety to use for ensilage. The yellow blossom is falling into disfavor and is not much grown now, but is sometimes sown with Alfalfa as a mixture for hay.

CHAPTER X

POTATOES—POULTRY

P**POTATOES** offer the largest return in human food that can be produced from an acre of land, and with all our enormous production of wheat, potatoes continue to be the largest single crop produced from the soil. The world's annual potato crop runs well over five billion bushels, while the world's wheat crop amounts to $4\frac{1}{4}$ billion bushels. The value and importance of the potato crop to the agriculture of the universe can, therefore, scarcely be over estimated. Potatoes have saved more than one country from famine and are quite as necessary as bread in the world's food supply.

Canada has not been a very heavy producer of potatoes, our annual crop being about eighty million bushels, though our soil and climate is particularly well adapted to the growing of these tubers. Almost every farmer, however, has his "potato patch," which gets more or less care, often less, and frequently his aim is to grow only about enough for his own table.

Early potatoes are a luxury that farmers frequently forego, for which no reason other than carelessness, can be given. Early vegetables are palatable and health giving, and for a little effort, all farmers can easily have them. Early potatoes need not be a "hot house" proposition. It is only necessary to have a small bit of land well manured in the Fall, using well rotted manure if possible, have it plowed early in the Spring and the potatoes planted at once. Get this done as soon as you can get on the land and you will be surprised at how easily you can beat the neighbors with your early potatoes.

Land for Potatoes grow best on a medium light friable loam.

Potatoes In stiff clay the tubers are apt to be badly shaped, and in sandy land the supply of moisture is usually insufficient. If the land is light, a crop of clover should be plowed in and barnyard manure added to supply humus enough to hold the moisture, keep the land open, and also furnish nutriment for the crop.

Commercial fertilizer can be used with good results in growing

potatoes, and can be added to the supply of barnyard manure. A potato crop is one that can easily be doubled by enriching the soil in which you are planting. A good fertilizer to use for potatoes is that which is sold as 2-12-6 and you can apply anywhere from 400 lbs. to 1,000 lbs. per acre. It is best not to let the commercial fertilizer come in contact with the seed potatoes, consequently, a good way to apply it is to sow the fertilizer on the field after planting, and then harrow to cover it. If the potatoes have been plowed in, this plan works well.



Winners in the Ontario egg laying contest 1926-27, owned by Cackleberry Poultry Farm, G. A. Burns, Prop, Paris, Ont.

How Potatoes Grow In growing potatoes, four distinct forms of vegetation are developed. The roots, the stems above ground, the foliage, and the underground stems upon which the tubers are produced. The plants obtain their plant food and moisture through the roots, the leaves performing the usual "breathing" functions of a plant. The **rhizomes**, or **underground stems**, are really extensions of the stems which bear the leaves, and the tips of the **rhizomes** grow into tubers and thus form the potatoes. Thus, the rootlets nourish the stem above ground and it delivers nourishment through its underground extensions to the growing potatoes.

This system of producing a crop requires loose, deep soil which the growing potatoes can push aside; plenty of nourishment for the roots to support vigorous stems, that they may in return nourish the tubers; and warmth, air and moisture to sustain this growth. Drainage is also important, as potatoes will not grow well on land that is waterlogged.

Planting Potatoes There are machines for planting potatoes that work well, and if the acreage you are growing will warrant it, one should be purchased. There are machines that distribute fertilizer as they plant the tubers and this is the kind that should by all means be secured. Where a farmer is only planting an acre or two it is quite a good plan to plow them in, planting in every third furrow, dropping the potatoes twelve inches apart, and plowing quite shallow. The land should be harrowed immediately after planting. If you can only afford to buy one machine for potatoes, buy a digger rather than a planter. It is easy to drop the potatoes after a plow in planting, but in plowing them out there is a deal of work to get all the crop, which a digger does well.

What to Plant There have been discussions going on for at least half a century as to whether whole potatoes, large sets, single eyes, or small potatoes, should be planted. Certain conditions may govern results in this matter, but on the whole, it has been found by the Dominion Experimental Farms, that good, medium sized potatoes, cut into about four sets, produce rather the best results. Potatoes should be planted soon after being cut as the sets should not be allowed to dry out. If the whole potatoes are spread out in the sun for a few days before cutting the sprouts will start and the cutter will have something definite to guide him in his work. The crop will also come on more rapidly.

Potatoes should be treated for scab before planting. The simplest method is with hot Formalin mixed at the rate of one pint of commercial Formalin to $12\frac{1}{2}$ gallons of water. The potatoes should be dropped in this mixture for about two minutes while the temperature is held at from 118 to 124 degrees Fahrenheit. A dairy thermometer should be used to take the temperature. If steam is available the treatment is much simpler.

Cultivating Potatoes As soon as the leaves of the potatoes show above the ground, harrow them and continue harrowing to keep the weeds in check until they are up a few inches, and are showing in well defined rows. It is time now to use the scuffer, and as often as weeds appear they should be scuffled.

The drills should be gone through with a hoe to cut out all the weeds and thistles between the plants. The crop should be hoed at least twice, once after the first scuffling and later as occasion may demand. If a crust forms on the land after a heavy rain, scuffle as soon as the surface is dry, to break it up and conserve the moisture.

Spraying Spraying potatoes for Blight has become a necessity in many districts. For this the Bordeaux mixture is used, viz.:

Copper Sulphate (bluestone) 4 to 6 lbs.

Unslaked lime 4 lbs.

Water 40 gals.

Where the Colorado beetle has found his way to your potato crop you require to treat him to a banquet of Paris Green or Arsenate of lead. There are some "Bug Killer" mixtures put up ready to apply that are quite effective.

Storing Potatoes The best place for storing potatoes is either in pits or in a home-made root house built in a side hill. In the West, where there are heavy frosts in Winter, the root house is best as pits are difficult to make frost proof.

The locality in which you are constructing your root house and the frost it has to withstand will be your guide in building it. It should be all underground and have a frost proof cover with ventilators that can be opened on favorable occasions. Ventilators can be made of boards six or eight inches wide and can be closed by stuffing them with straw. The roof of such a root house should be supported with poles, planks or slabs, sodded over, then covered as you would a pit, and over that a good covering of horse manure. The sides can be lined up with rough lumber or slabs to keep the earth from falling in.

Do not fill the root house to the roof; leave about three feet of empty space. Leave a good air space between the potatoes and the roof. Have double doors on it, or an inside door and a hatch outside. These doors should be two or three feet apart and the space between them stuffed with straw. Pea straw is best if you have it.

A Kitchen Garden A kitchen garden is one of the essentials on a farm, but because of the easy opportunity to have one it is frequently neglected. The soil in most parts of Canada is well adapted to the growing of vegetables, and if it is a heavy clay it can be so treated with manure and fertilizers as to make it good garden land.

Green vegetables are only first class when they find their way to the table immediately after they are gathered. If allowed to wilt they become quite inferior both in flavor and texture, so this is surely one luxury the farmer can have without much effort.

It is not our intention to discuss the details of a garden, but just to call attention to the necessity of its forming a part of the plan for farm work. The treatment of land for potatoes or roots is the sort of treatment required for a garden, and early vegetables and greens, fresh from your own garden are things you should not deny yourself.

Flowers and Lawn A few flowers about the place and a nicely trimmed lawn will add greatly not only to the appearance of the home but also to the pleasure of living in it.

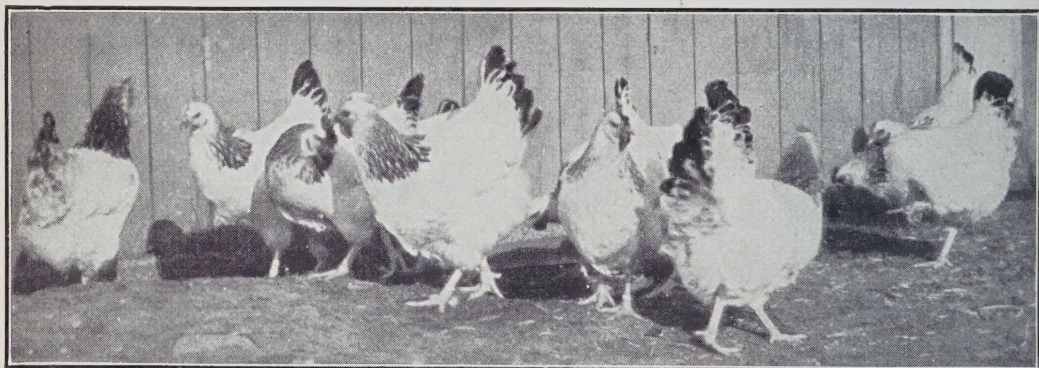


Grounds at the farm house of Andrew Anderson, Alsask, Alberta

If every person about the farm would take some interest in this form of beautifying your surroundings, you would be surprised at what a little effort would accomplish.

Trees and Shrubs Every farmer should plant a few trees each year. For several years I made it a part of my plan on my farm in Alberta to have all hands spend a week after seeding in planting trees and shrubs, fixing up the lawn, and making the grounds about the house a little more presentable. We didn't spend half enough time but it was surprising what we finally accomplished, in the way of a new fence, a plot of green grass, and trees and shrubs that grew with amazing rapidity.

Andrew Anderson, of Alsask, Alberta has demonstrated what a man with a real genius for beautifying a place on the bald prairie can do. His farm is in a district that looked, when he came there in 1910, like a pretty difficult place to grow trees or shrubs, but the illustration of part of his grounds shown on page 113, shows what he has accomplished. Mr. Anderson has made just as great a success of growing wheat on this dry prairie and is one of Western Canada's very successful farmers. What he has done can be achieved, in part at least, by other Western farmers and would add a great deal to the attractiveness of farm life.



Pen of Light Sussex hens, owned by Manor Farm, Clarkson. Awarded Gold Medal by the English Club for Winter egg production

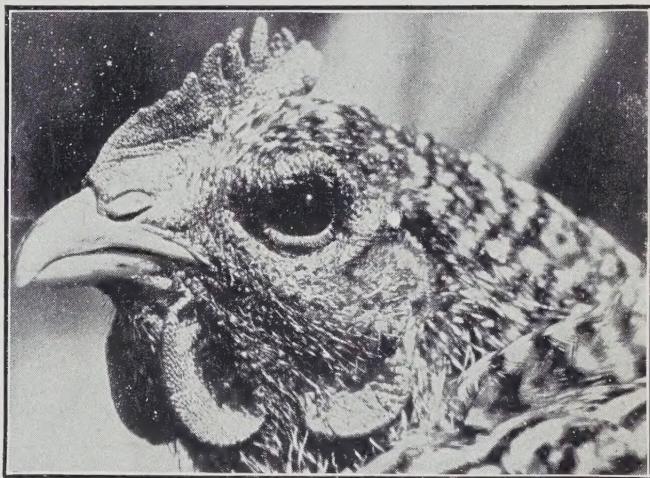
Poultry No farm yard should be without poultry. The raising of chicks and other fowl is a part of farming, but is often done in too haphazard a fashion. We do not purpose dealing

with it here in a very extensive manner, but only to point out a few facts that may be a guide to some people who have had little experience in this feature of farming.

Improved methods of keeping poultry are being discovered each year, and even if you only purpose having a few laying hens it will be worth your while to keep up-to-date and get from your nearest school or college of agriculture, or from any Department of Agriculture or Experimental Farm, the latest advice on caring for barn yard fowl.

Eggs and Broilers Every farmer's table

should be supplied with fresh eggs and roasting birds from his own farm. These are luxuries in living to which every farmer's family is entitled. By this we do not mean fresh eggs in May, but in Winter when they will be appreciated, and broilers in the early Autumn when they taste much better than later in the season when they have ceased to be a luxury.



A fat head, not a good layer
(Courtesy Ontario Department of Agriculture)

Breeds of Poultry The commonly known utility breeds of chickens are Barred Rocks, White Wyandottes, Rhode Island Reds, Buff Orpingtons and Light Sussex. The first three are American breeds and the last two English. Most of these breeds have been produced in different colors as we have "White Rocks," "Silver Pencilled Wyandottes," etc., but they are mostly recognized by the first mentioned names.

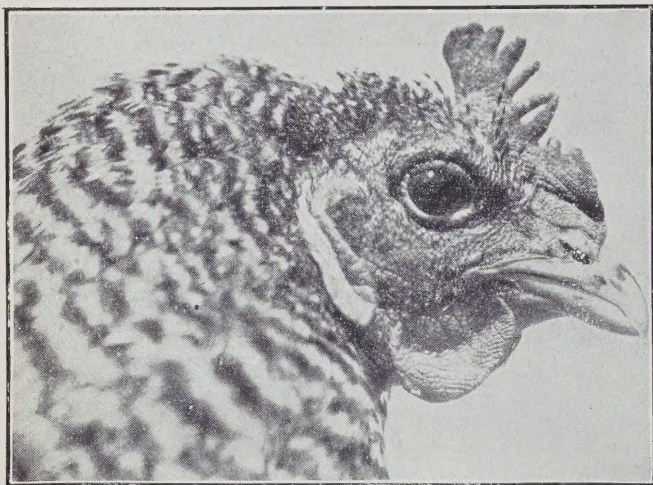
These breeds are sort of dual purpose being bred for the production of eggs and table birds. There are Mediterranean breeds such as White Leghorns, bred mostly for egg production, but

these fowl are not so well adapted for the Canadian farm yard. They do better in a mild climate and are not good broilers. The utility birds are best adapted to the farmer's needs.

The Strain's the Thing In selecting a breed the strain is the thing to keep in mind. Poultry is kept for egg production and broilers. No one wants to be bothered with hens that will not lay. In recent years a great deal of selection

work has been done with a view to increasing egg production. Bred-to-lay strains are to be found in almost every breed, and can easily be obtained.

The proper way to start is either with a few birds, or some settings of eggs from a reliable strain that has made good laying records. We have known persons to begin by getting one or



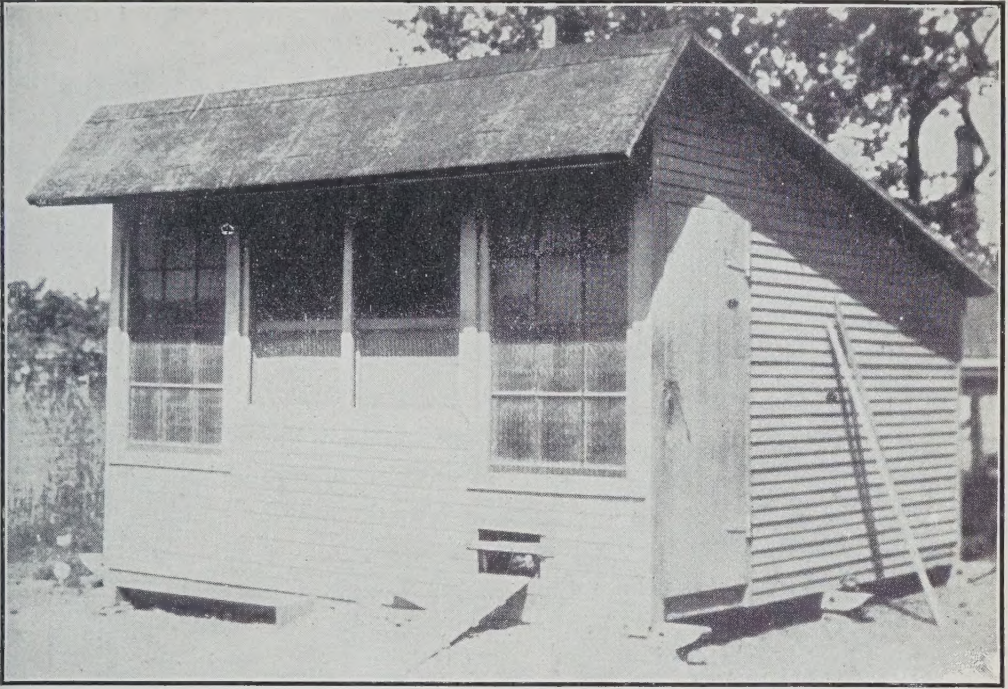
A good head, bright, alert, alive
(Courtesy Ontario Department of Agriculture)

two hens with records and saving and setting all their eggs. That you may continue to improve your flock it is very necessary to select your rooster from a heavy laying strain as well.

This is so obviously the proper way to begin that no one should consider just keeping common fowl when improved strains can be obtained so easily and so cheaply.

Housing Poultry Poultry must have a house that is bright and dry. It need not be too warm, but comfortable. The South side should be almost all cotton front, the cotton tacked on frames to swing up inside and let the sunlight in.

The house should be kept scrupulously clean, and be disinfected often to keep it fresh and healthy. If it is not warm enough in Winter have a drop curtain to let down on cold nights in front of the roosts. Keep the floor covered with clean straw for scratching.



*A very useful type of colony house built on runners for easy moving
(Courtesy Ontario Department of Agriculture)*

Feeding Poultry Don't let your hens "pick their living." If they are any good they are worth feeding. Feed your hens to lay. Look up the proper feeds and you will usually find in your granary the ingredients for a balanced ration.

Don't neglect fresh water for the fowl. Give it to them with the chill off in Winter. A trace of permanganate of potash in the water will have a good effect on the health of the birds. Skim milk, just beginning to thicken is good food for hens.



*A crow head, poor type
(Courtesy Ontario Department of Agriculture)*



A good head, front view
(Courtesy Ontario Dept. of Agriculture)

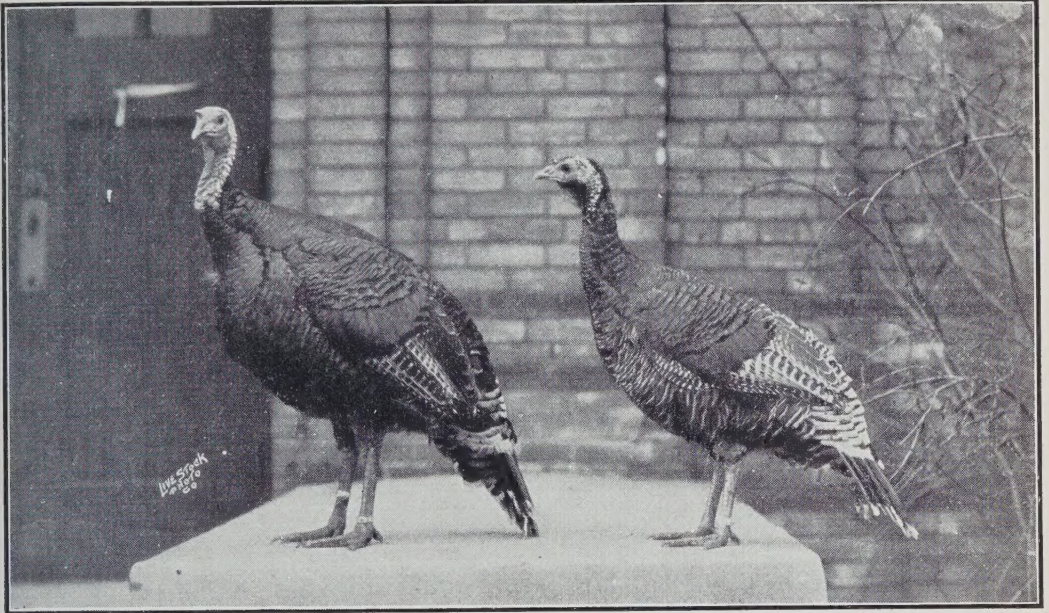
Pullets should be well fed to mature them early and so get eggs from them sooner. If the colony houses, in which you raise your chicks, are built on skids, they can be drawn after harvest, out into a grain field, at night when the chickens are roosting, and the birds will pick up plenty of grain. A house built like the one presented here is a good one for this purpose and is a very handy and useful house to build. It can be banked and made warm enough for Winter by having it lined inside and making a loft in it which can be filled with straw. Don't fail to supply the birds with water.

Culling Birds In culling your birds there are a good many rules to follow, but with hens as with most other living things, the head is quite a good guide. It must be bright and alert, not fat or "crow" looking. We are indebted to the Ontario Department of Agriculture for the pictures of heads here reproduced. Be guided, however, to a considerable extent by the ancestry of your birds.

Turkeys for Xmas A small flock of turkeys can easily be raised on every farm. Someone must be willing to give them the patient care they need when young, and when they get a fair size they will look after themselves quite well.

Prof. Graham, of the Ontario Agricultural College, has achieved some considerable success in raising turkeys, the secret of which is, he says, never to feed the turkeys on the ground. He recommends using a clean trough or platform. Most of the ailments to which turkeys are heir, he says, are picked up off the ground. His plan looks like a safe one to follow.

Don't pen up your turkeys to fatten them. They must have



Prize-winning turkeys owned by R. H. Stapleton, St. Louis, Sask.

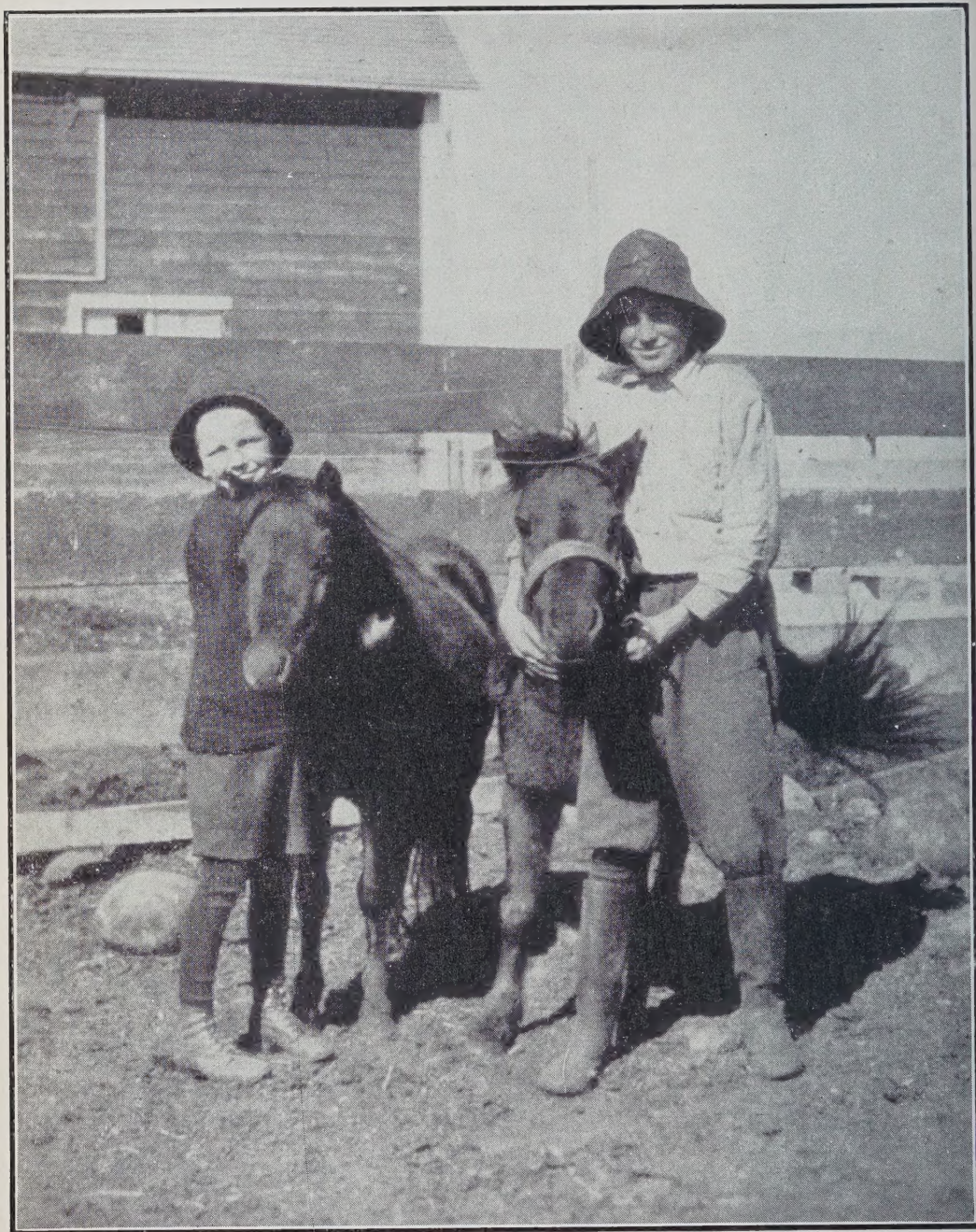
liberty or they will not thrive. Let them roost in the apple trees, or build them convenient, outside roosts for the Autumn, feed them well and you will have birds for Thanksgiving and Christmas that will be hard to rival.

Ducks and Geese Ducks and geese are water fowl, but if they get a trough to wash in, it is not important that they should swim. Geese are vegetarians and will clip off an acre or two of grain in good shape. Ducks should be fed steadily from the time they are hatched until about ten weeks old when they are at their best for roasting.

Ducks are good feeders and are very satisfactory birds to both feed and eat. If they are pushed for a little over two months you will be surprised at the size and class they will show on the table.

Somebody's Work Caring for the poultry on a farm should be the definite work of some one person, so that it will be planned out and performed at the proper time and with sufficient care. It should not be done in a slipshod or haphazard fashion. Better keep half the fowl, in a proper way to make them remunerative, than a large lot on the happy-go-lucky plan of just having hens in the barn yard. Get poultry bulletins from

your Provincial or Federal Department of Agriculture for information respecting the details in poultry raising.



Good playmates for farm boys



Clydesdales on Parade at the Stirling, Scotland, Show

Chapter XI

PURE BRED LIVE STOCK

Horses

THE character and value of the commercial live stock of a country can be fairly determined by the class of its pure bred live stock. We speak of live stock with pedigrees registered in some recognized "Book" of records as being pure bred. We sometimes hear the expression "Thoroughbred cattle"—this is a misnomer, the proper name is "pure bred" cattle. "Thoroughbred" is the name of a breed of horses, just as "Clydesdale" is the name of another breed, and the term "Thoroughbred" should be used only to designate a breed of English race horses.

The value of a pedigree is in the fact that the animal possessing it has, in this paper, a certificate as to the identity of its ancestors. We, therefore, have a knowledge of how a pure bred animal has been produced, and we are enabled to look up the

class and character of ancestors it has, to see if, in using it for breeding purposes, we run any risk of introducing undesirable lines of breeding into our live stock. These recorded facts are the sole value of the pedigree, the quality of the animal must be its own testimony as to its individual excellence.

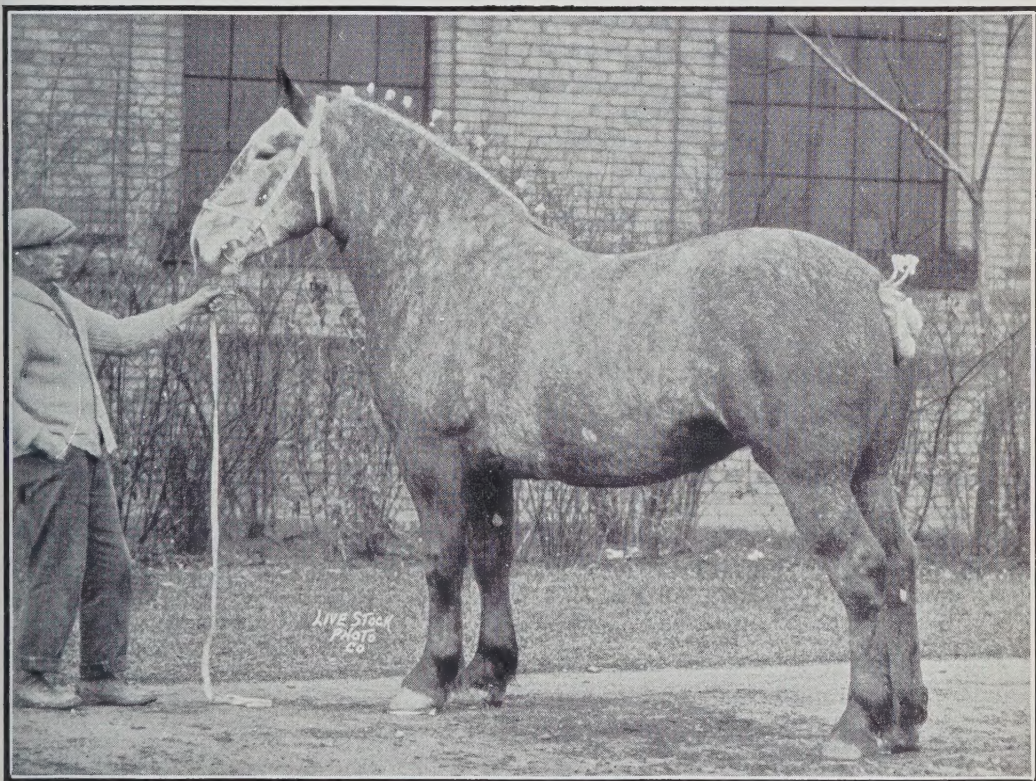
The only means breeders of commercial live stock have of improving their stock is by the use of good sires. The only way they can secure prepotent sires is from the breeders of pure breds. The use of grade or nondescript sires would be more likely to reduce the quality of their live stock than improve it. The cost of a sire to be used by breeders of commercial live stock must not be too high or they will hesitate to make the purchase, consequently they must find him near home. Travelling expenses and freight charges soon add materially to the purchase price, therefore, the improvement in commercial live stock in any country, or in any section of that country, is determined by the men who are enterprising enough to engage in the breeding of pure breds, and so make pure bred sires easily available to the average farmer.



Prize winning group of five Percheron stallions exhibited by C. M. Rear, Regina, Sask., at Chicago International

Encourage Pure Bred Breeding This is the reason why Agricultural Departments and Exhibition Associations spend so much money and effort for the improvement of the pure bred live stock, as its improvement directly results in the improvement of all the live stock, and by no other means can the average quality of the farm animals of a country be raised to a higher standard.

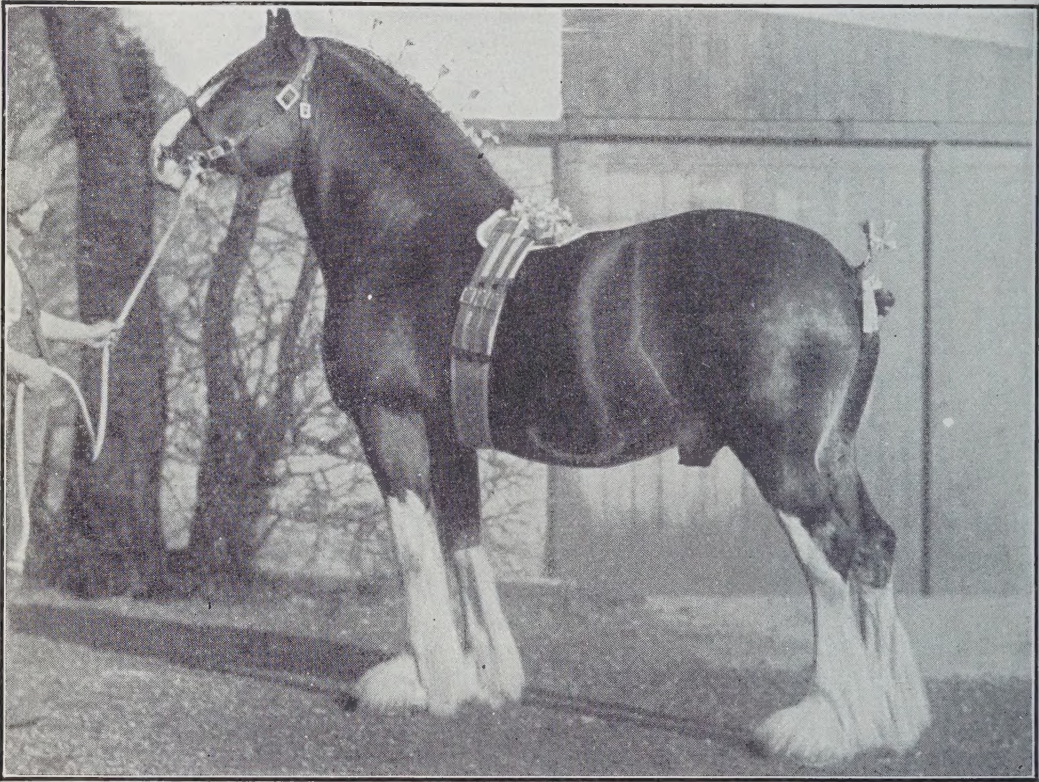
There are a great many different breeds of horses, cattle, sheep and hogs, but it is not desirable that too many of them should be bred in any one country, and especially in any limited district. It is much better to have a few breeds that are adapted to the soil and climate of a country brought to a greater state of perfection through the competitive work of a large group of breeders, than to have a larger number of breeds in the hands of these breeders and thus have the efforts of our animal husbandmen scattered too much.



Monarch's Rose, grand champion Percheron mare, Toronto Royal Winter Fair 1926 and 1927, owned by Mrs. E. Wood, Sanford, Manitoba

Canadians have acted wisely in this respect, as only a limited number of breeds have been developed here and they have generally been well selected with respect to their adaptability to conditions in the country, and the needs of the farmers who are raising them.

In horses, the farmers of Canada have, of recent years, been confining their efforts to the draught breeds. Some saddle horses are produced but their numbers are not large. In draught horses, Clydesdales, Percherons and Belgians are being bred, somewhat in the order named, with a few Shires being produced, but the latter do not find much popular favor in this country at the present time.



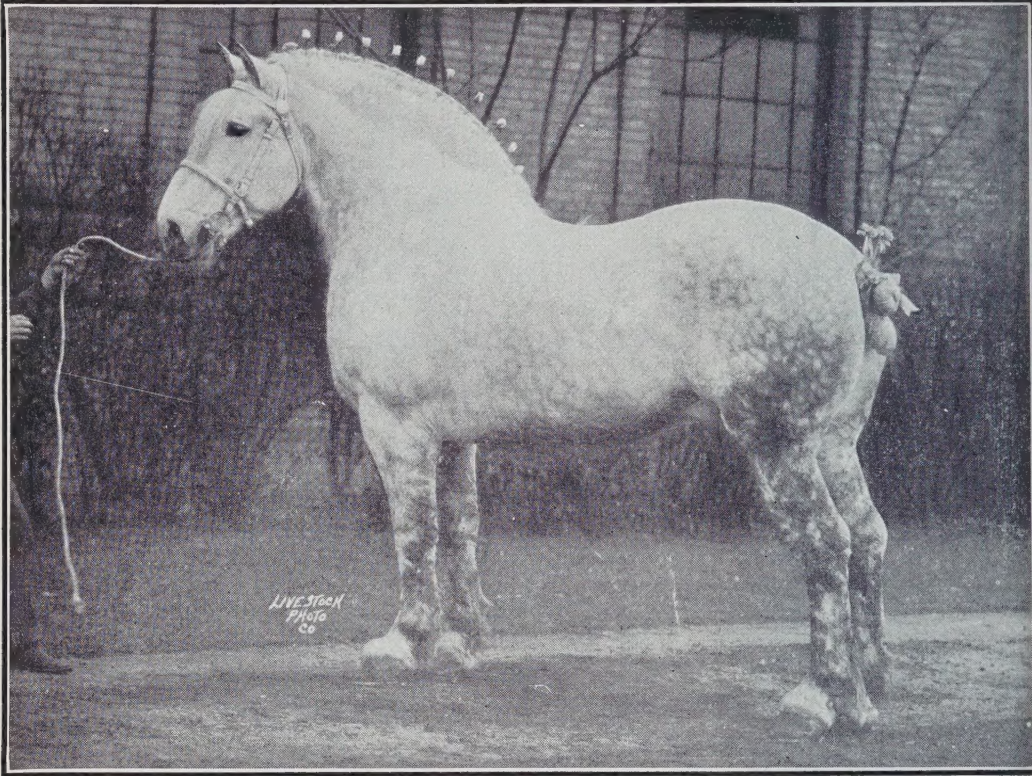
Craigie Ambition, Winner of the Bryden Shield, Meiklem Gold Cup, and the Caldwell Cup, which is the Grand Championship at the 1929 Glasgow, Scotland, Stallion Show. Owned by James Kilpatrick, Craigie Mains.

The Clydesdale The Clydesdale, bred in Scotland, was at one time the dominant breed in Canada because of the large, early immigration of Scotsmen to Canada. The Clydesdale has been bred for superior underpinning, flat legs, wide hocks, sloping pasterns and large hoofs with wide heels. Good specimens of this breed are very true, straight movers, and their legs are well set under them, to give the proper purchase for moving loads. Great care has been exercised in their breeding to free them from any predisposition to spavins, curbs, side bones or other blemishes that reduce the value of horses.

Clydesdale breeders take some pride in the nice silky feather, or hair, that adorns the legs of their favorite breed, and also in the covering of long hair, or spat, over the hoof heads. The claim is that this hair protects the hoofhead, which must be kept in an open, healthy condition if a horse's feet are to last in heavy work on the pavements. It is maintained by some that too much attention has been paid by Clydesdale breeders to legs and feet, and in selecting breeding horses by this standard alone they have sacrificed weight and substance with the result that many of them are short in the ribs and lack the bulk wanted in a draught horse.

Clydesdale feet and legs have become a standard for draught horse breeding, and to say that a horse of some other breed has feet and legs like a Clydesdale is to give him high praise. The "Lordly Scottish Draught" has it pretty much his own way in the show ring. In the gelding competitions at all the large shows, the Clydesdale is invincible and sweeps all the other breeds before him, but as the bulk of our horses are not required to measure up to any show yard standard, this does not mean that the Clydesdale reigns supreme.

The Clydesdale horse is inclined to be high tempered and requires rather careful handling in breaking and driving him. Scottish horsemen take great pride in the teams of geldings to be found working on the streets of Glasgow and Aberdeen. These are all high class, carefully selected, commercial draught horses and are a remarkable testimony to the efficiency of the Clydesdale in hard work on the pavements.



Monarch, grand champion, Percheron stallion, Royal Winter Fair 1926 and 1927. Owned by Carl Roberts, Osborne, Man.

The Percheron The Percheron horse, bred in La Perche in France, has really been a horse made to order to suit the United States demand for a "heavy" horse. A horse in the United States is always measured by his weight. We get here one radical difference in ideas about a horse. Ask a Scotsman how big his horse is and he will tell you its height. Ask an American the same question and he'll give you its weight. Ask a Scotsman its weight and he will likely reply, "Ye never hear a man speirin' the weight o' a horse in Scotland, if he'll be guid enough he'll be big enough." These two viewpoints mark a difference in their ideas about a horse.

The United States farmer doesn't want a horse with hair on its legs. The black lands of the central states is easier cleaned from the legs of a Percheron. American cities have grown rapidly and from them came a demand for "big" horses to move

oads. Most of the men who bought them figured mostly on size. Grey Percherons made flashy harness horses and the demand was for a "nicely turned" horse, round in the barrel, smooth over the quarters and with a showy crest—a horse whose body filled the eye. Percherons are less nervous and inclined to be easier keepers than Clydesdales, so they were always fat and looked good. Their legs and pasterns might not be so well set, or so flash, or might not even wear so well, but the horses were big, smashing greys and blacks, that looked well in harness, kept in good flesh, and were so docile and tractable that any inexperienced hired man could drive them, and this latter qualification was a most desirable one.

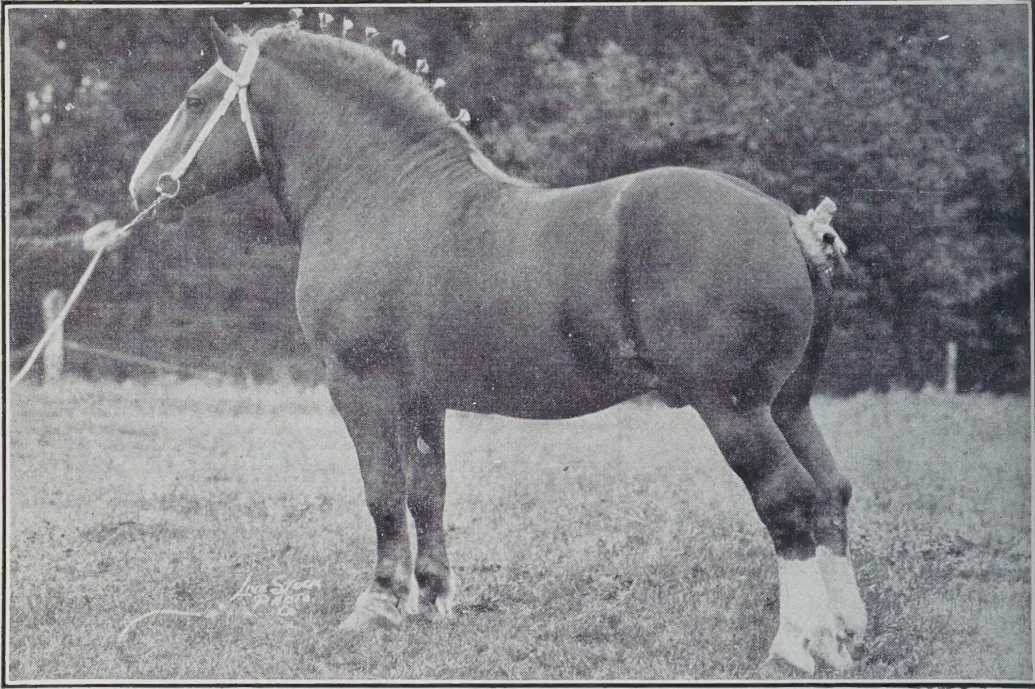
The breeders in France, and later in the United States, have shown what can be done with a breed of horses in the perfection to which they have brought the Percheron. Weight and bulk were their first determination, but later they have added improvement in quality and underpinning and the Percheron has become one of the world's greatest draught horses, with admirers and advocates everywhere that horses are bred.

The Belgian The Belgian draught horse has improved more in his "personal" appearance than any other in a period covering thirty or forty years. He was originally a big, slab-sided, steep-rumped horse often with a big, coarse head, and had little to recommend him except his ability as a beast of burden. When it was found that there was a strong demand in the United States for draught horses, but that these horses must not only be big, but must be attractive in appearance, the Belgian farmer set himself the task of improving the appearance of his horse, and made rather a good job of it.

Size of bone has always been a strong feature in Belgian horses. The breeders believe, to get weight in their animals, they must have strong bones to carry it and also to draw loads, and no draught breed is as jealous about the girth of its legs below the knee as is the Belgian.

The Belgian Government, many years ago, arranged a system of subsidies for stallions which was a means of keeping the best in the country and it greatly aided improvement in the breed.

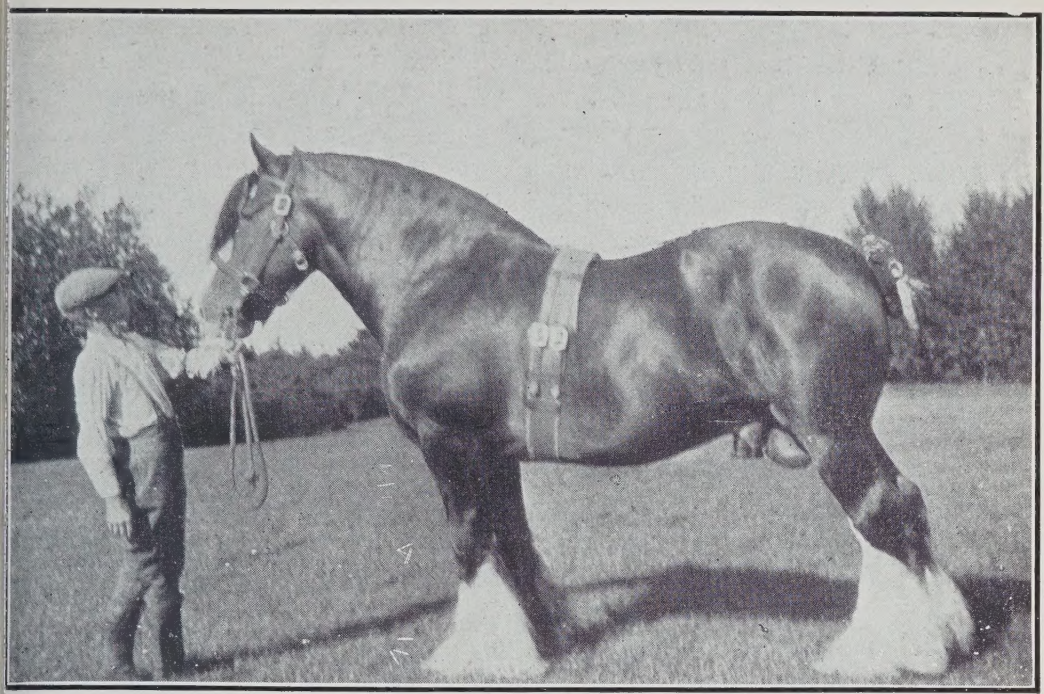
Symmetry of form was what the Belgian horse lacked most



*Major de Malmaison, grand champion Belgian stallion of the
National Belgian Horse Show of America*

some years ago, but careful selection in mating has produced horses of this breed that would rival the best in beauty and attractiveness. The Belgian draught horse has always been a good mover. He can trot like a hackney and lifts his feet cleanly and quickly. He is probably the most even-tempered of all the breeds and in the language of David Harum, "He will stand without hitchin' and a woman can drive him as well as a man." He is easily broken and handled, and for this reason alone is favored by many farmers. The Belgian geldings at work on the wharves of Antwerp before the war were a treat to see. Great massive horses, most attractive in appearance, and pulling enormous loads without much effort. Breeders and importers inform us that the breeding of Belgian horses is again fully established in Belgium, and recent importations would seem to bear out this statement.

The Shire The Shire horse has been the pride of the English yeoman for many years. He is perhaps the most massive of all the draught breeds, but for an animal of his size,

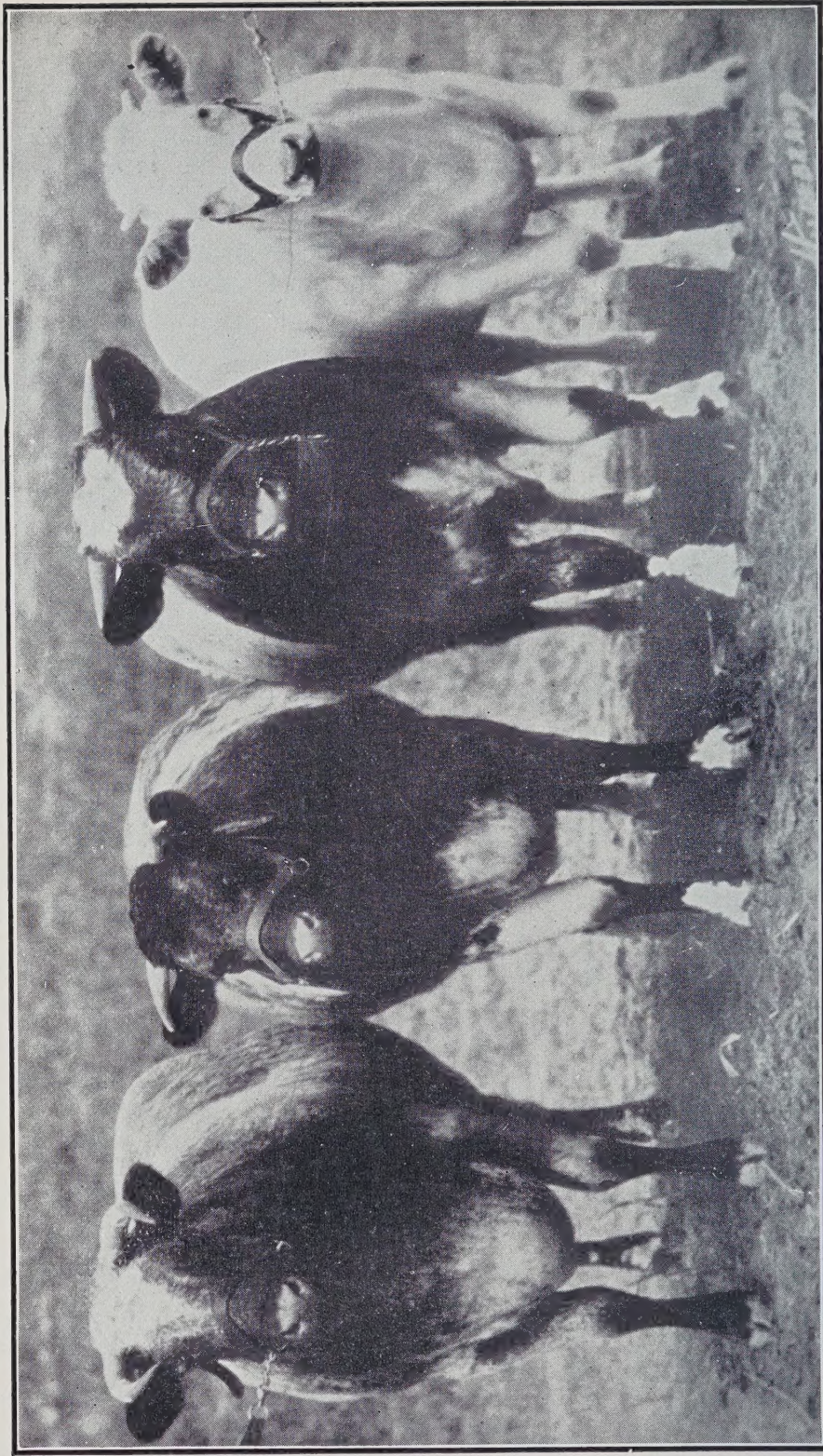


*Snelston Topper, Shire stallion owned by Dominion
Experimental Farm, Lacombe, Alberta*

is very active and a brisk walker. He is a great horse to move loads and can put weight into the collar in any heavy work. The chief objection to the Shire, on this side of the Atlantic, is the hair on his legs. A few years ago the fashion in Shires in England was to have a super abundance of hair and sometimes it completely encircled the legs and was admiringly referred to by the Englishman as "the brush," and brush it surely was. Often this hair was quite coarse and wiry. Shires of this kind require more attention than horsemen will give them here, and working in the mud soon produced grease heels.

There seems to be a tendency at the present time to get away from this abundance of hair on the Shire and breed for a nice feather of finer hair on the legs, which would be more in keeping with Canadian ideas.

Shire stallions make a good cross on common mares, generally producing colts of a good weight at maturity. There has been a good deal of discussion with respect to crossing Shires and Clydesdales, but it has come to nothing.



*First prize Shorthorn get of sire group at the Philadelphia Sesqui-Centennial Exhibition, 1926
Bred and exhibited by T. A. Russell, Toronto, Ont.*

*Chapter XII***BEEF CATTLE**

THERE are three breeds of beef cattle bred in Canada—Shorthorn, Hereford and Aberdeen-Angus. There have always been a few Galloways but they have never been very strong. They are a rather slow maturing cattle, and while suited to parts of Scotland, they have never made many friends this side of the ocean. Galloways produce a high class of beef, and frequently win the carcass competitions at the Smithfield Fat Stock Show in London, England, but in this country with its abundance of feed and a demand for early maturity in beef animals, the Galloway is not likely to be a factor.

Shorthorns Shorthorns were the pioneer cattle in Canada and for many years kept far in the lead of other breeds. While they have not lost their popularity, changed conditions and larger population (together with the growth of dairy farming) have made places for other breeds. Shorthorns being, at the time of the early settlement in Canada, the leading British breed of cattle, accounted for their predominance in this country. The settlers who came from Britain to Canada were accustomed to livestock farming in their home land, they knew Shorthorn cattle there, and some of the most progressive of them became importers of their favorite breed into the new country.

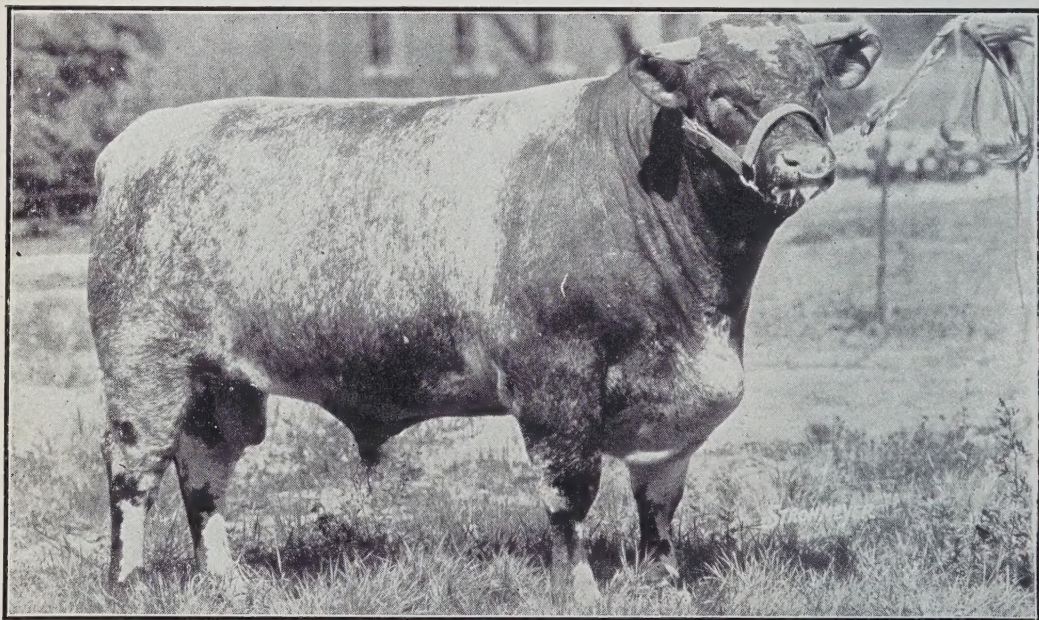
As early as 1826, Shorthorns came to this country, the first landing in New Brunswick; but it was in 1833 that the first importations of importance arrived. These cattle came to Guelph, Ontario, and from that day down to the present time, Guelph has been a livestock centre in Ontario.

Frequent importations were made in the succeeding years, working great improvement in the herds on this side of the ocean.

Shorthorns originated in the valley of the Tees, in the North of England, and as some of the first were bred in the County of Durham, they have often been called "Durham" cattle. There never was, however, a registered breed of "Durham" cattle and the name was only a local one as applied to Shorthorns.

Shorthorn bulls have always been great improvers when used on herds of common cows, and cattle of this breed have been popular in Canada for almost a century, largely on this account. English Shorthorns were bred both for beef and milk and for many years were the milk cows of England. In a new country like ours, these Shorthorns were pre-eminently the farmers' cows. They furnished his family with milk, his table with butter, and the butcher with beef. They were peculiarly adapted to the pioneering of the timber lands of Ontario as steers of the breed made good work oxen.

About 1837, Amos Cruickshank, a tenant farmer at "Sitty-ton" in Aberdeenshire, Scotland, began breeding Shorthorns and attained rather phenomenal success. This shrewd Scottish Quaker, a stockman of rare ability and judgment, had in mind a type of smoother and thicker fleshed cattle than most Shorthorns being bred at the time. He made careful selections and proved a wizard at producing the kind he favored until he finally evolved



Edellyn Favorite, grand champion Shorthorn bull at Canadian National Exhibition and Royal Winter Fair, Toronto 1928, owned by Col. F. H. Deacon, Toronto

a new type of Shorthorns that since have been known the world over as "Cruickshank" cattle.

The result was to finally divide the Shorthorn breed into two classes, though they are all registered in the same herd book and are bred from the same foundation stock. The Cruickshank cattle are today known everywhere as "Shorthorns," while the other branch of the breed are classified in England as "Dairy Shorthorns," in the United States as "Milking Shorthorns," and in Canada as "Dual Purpose Shorthorns." As the names would indicate, these cattle have been developed for milk while maintaining a fair standard for beef.

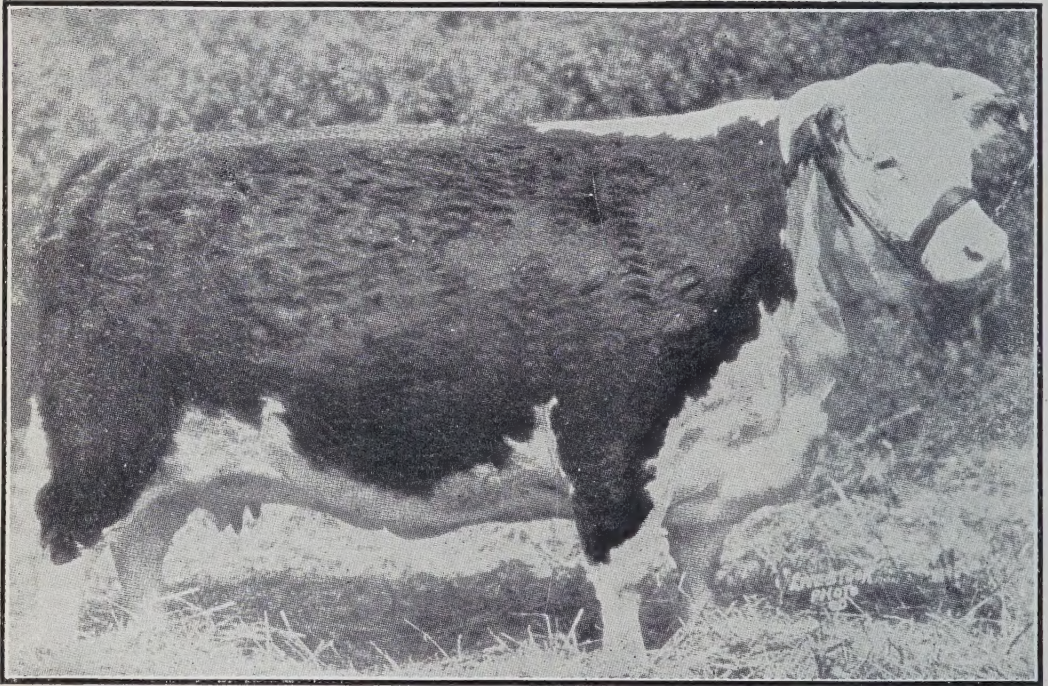
Shorthorns have been developed into thick-fleshed, smooth, compact, short legged cattle that, while maintaining a high standard for quality, usually excel other beef breeds in weight for age, and for crossing cattle either on other breeds or on common cows are not easily equalled. In color, Shorthorns are red, white and roan and have very attractive breed characteristics in their heads, horns and general appearance.

As Amos Cruickshank evolved his new type of Shorthorn, they did not at first find favor in Great Britain, and fortunately for Canadian cattle breeders, Mr. Cruickshank made a business arrangement with a fellow Aberdonian in Ontario, James I. Davidson of Balsam, Ont., to handle the annual crop of Shorthorn calves from "Sittyton," with the result that from 1874, for a number of years, many of the choicest Shorthorns bred in Scotland came to Canada. Quite a few of them passed on across the line, but they were on this side of the ocean and their blood lines were available to Canadian breeders. These importations laid the foundation deep and strong for Shorthorns on this continent. At the same time other importers, breeders and exhibitors were giving strong support to Shorthorns, among whom were Hon. Adam Ferguson, of Waterdown; Wm. Linton, of Aurora; J. Russell, of Richmond Hill; Hon. David Christie, of Paris; The Bow Park Farm, of Brantford; Hon. John Dryden, Minister of Agriculture for Ontario; John Miller & Sons of Brougham; J. and W. B. Watt of Salem; James Gardhouse & Sons of Highfield; Arthur Johnston of Greenwood; Thos. Russell, of Exeter; John Meyer, of Kossuth; The Robsons, of Ilderton; The Smiths, of Huron and Middlesex; and so many

others that the list would be too long for this space. These men all farmed in Ontario, and Hon. M. H. Cochrane of Hillhurst, Quebec, was importing and breeding cattle for his Quebec farms and his ranches at Cochrane, Alberta. James Yule, an Aberdeenshire Scotsman, was among the first to take high class Shorthorns into Western Canada. As manager of the herd of Hon. Thos. Greenway, Premier of Manitoba, and later as Manager for Sir Wm. Van Horne, President of the Canadian Pacific Railways, Mr. Yule put show Shorthorns on the map on the prairies.

A number of the families mentioned are still breeding Shorthorns, as one of the outstanding features of breeding high class livestock is that it is often handed on from father to son and is one of the finest inheritances that Agriculture has for the sons of the soil.

Mr. Geo. E. Day, Guelph, Ont., is Secretary of the Dominion Shorthorn Breeders' Association.



Willow Spring Gay Lass 414th. Bred by Frank Collicut, Crossfield, Alberta. Grand champion female at the Chicago International

Herefords Hereford cattle are a distinctly English breed, having their origin in Herefordshire, England. This district is a great grazing ground and naturally developed a breed of cattle suited to its pasture fields. The Hereford breed originated in the days when cultivation was performed mostly with oxen and the aim of the breeder was to get large, deep-chested cattle of great strength, for labor in the fields.

The color of the Hereford—red with a white head—was fixed early in the history of the breed, and this uniformity in color lends attractiveness to groups of “white faces” that has won the favor of many a potential cattle breeder.

The first Hereford cattle that came to Canada arrived, like the Shorthorns, at Guelph, and were imported in 1860 by F. W. Stone, of Guelph, an English farmer from Warwickshire. These cattle were brought to the farm now occupied by the Ontario Agriculture College, then called “Moreton Lodge,” and owned by Mr. Stone who, some years later, was the owner of the largest herd of Herefords on this continent.

It was not in Ontario, however, that Herefords reached their full popularity in Canada. It was on the Western prairies that the White Faces proved most useful to Canadian animal husbandry. These cattle are great grazers, and it didn't take the rancher long to learn that a Hereford cow would feed her calf and go into the Winter in very good flesh herself, and that the calves were such good “rustlers” that they made up with grass what they perhaps lost in milk.

Several ranchers stocked with good sized herds of pure bred Herefords, and bred bulls for their own grade herds on the range, and for others who wished to buy. The Baxter-Reid Ranching Company at Olds, Alberta, and later the McIntyre Ranch at Magrath, and Frank Collicut at Crossfield, in the same province, were large breeders of white faces and did much to popularize these cattle on the prairies. Willow Spring Ranch, owned by Mr. Collicut, had at one time the largest herd of pure bred Herefords in Canada, and it still continues to flourish as the home of an outstanding herd of white faces.

Simon Downie, of Carstairs; O. A. Boggs & Sons of Daysland; John Wilson, of Innisfail; Fred Cowman, of Cremona; W. M. Parslow, of Cochrane; and W. H. Curtice of Shepard

were among the prominent breeders of Herefords in Alberta, and James A. Chapman, of Hayfield, Harry Hyslop, of Killarney, and J. W. Crawford, of Pipestone in Manitoba.

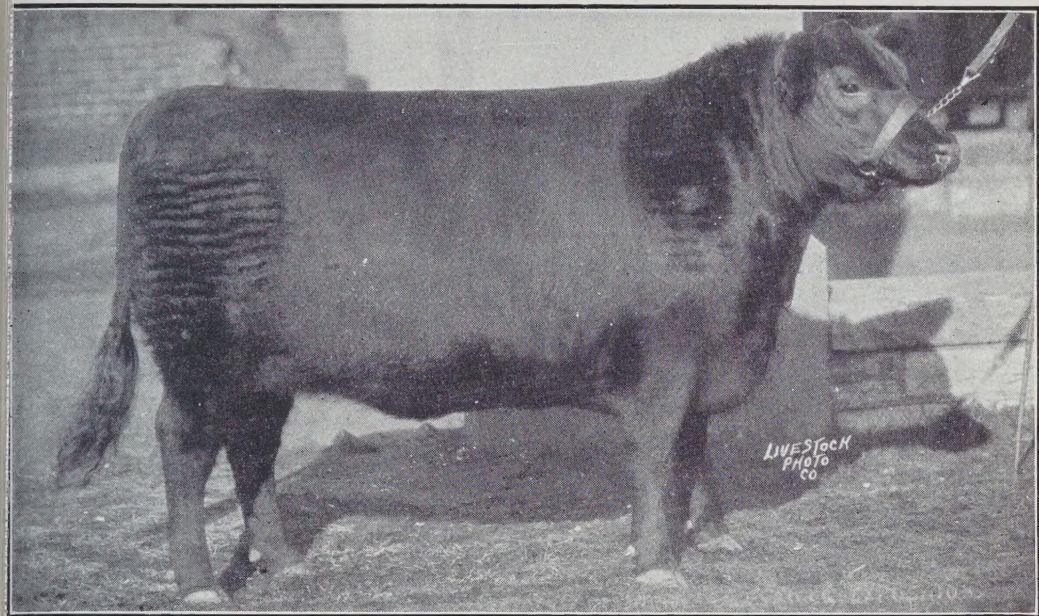
In Ontario, W. W. Hunter of Orangeville; Alfred Stone of Guelph; and Mossom Boyd of Bobcaygeon upheld the standard of White Faces. Later L. O. Clifford of Oshawa, was an extensive exhibitor.

It was to the enterprise of Mossom Boyd that both the existence and the excellence of polled Herefords in Canada is due. He associated himself with an American breeder, Warren Gammon, of Des Moines, Iowa, in this work. They created a new breed in a sense, and when they had the polled characteristics fixed they were able to introduce horned bulls for improvement in conformation.

The Hereford breed is one that has been improved on this side of the water. Conditions in parts of Canada and the United States suited them exactly, and here breeders set themselves the task of developing a smooth, compact, short legged, deep fleshed kind of beast. A large Hereford show on this continent is a revelation to a British livestock man.

Hereford steers are in high favor with feeders and with most ranchers this breed stands first. They are a great breed of very attractive beef cattle. H. D. Smith, Ancaster, Ont., is Secretary.

Aberdeen-Angus Aberdeen-Angus are a purely Scotch breed, having originated in the two Scottish Shires from which they take their name. Smoothness, thickness of flesh and early maturity are the three predominant features of these cattle. They are essentially a beef breed and their flesh seems to lend itself in the process of fattening to that marbling so much desired by butchers who cater to a discriminating meat trade. At fat stock shows, Aberdeen-Angus have been capturing more than their proportion of the awards for some years. Wm. McCombie, a great cattle feeding farmer of Aberdeenshire, Scotland, was the man who rescued these black, hornless cattle almost from oblivion. This shrewd farmer fancied them for his business and did much to improve them and encourage others to under-



*Glencarnock Jessie 9th grand champion female Chicago International
1927 bred by Jas. D. McGregor, Brandon, Man.*

take the same work, until today they fill a very important place in the cattle feeding world.

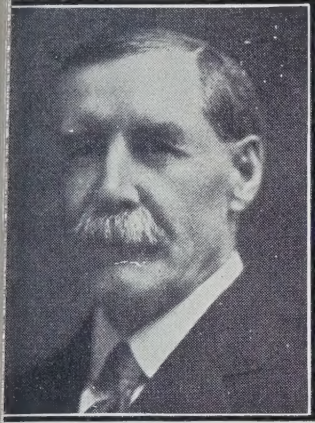
The first Aberdeen-Angus cattle to come to Canada were brought by the late Professor Brown to the Ontario Agricultural College at Guelph in 1876. It will be noted that the farming district around Guelph was the destination of the first pure bred Shorthorns, Herefords and Aberdeen-Angus cattle imported into Canada, which was rather a livestock distinction for this fertile farming neighborhood in Ontario. Three importations were made by the Agricultural College, and as the late Hon. J. H. Pope, then Minister of Agriculture for Canada, imported fifteen Angus cows and a bull in 1879, the black polled cattle got off to a rather distinguished start on this side of the water. The Popes had a ranch in Alberta and their black cattle were thus introduced into Western Canada. Hon. M. H. Cochrane, who also ranched in the West, was an importer of all three beef breeds of cattle and contributed not a little to the improvement of Canadian livestock.

The men, however, who put black cattle on the map in Canada were Jas. D. McGregor of Brandon, Man., now Hon. J. D. McGregor, Lieutenant-Governor of Manitoba, and James Bowman of Guelph. Their enterprise as exhibitors at all the large Canadian Shows brought these cattle before the livestock public in their most attractive form, thus giving the breed the most advantageous kind of advertising. Hon. J. D. McGregor was an enterprising salesman, a skilful breeder, and a good judge, and he and his sons have pushed their favorite cattle to the front and have been able to maintain them at a high standard of excellence. In the making of baby beef, the Angus cattle often excel their competitors and are frequent victors at the large shows.

In 1912, J. D. McGregor won the Grand Championship in the fat steer classes at the International Show at Chicago. This is the blue ribbon of that Show and the victory called attention to the excellence of Canadian cattle as well as being a victory for the Angus breed. In the following year, Mr. McGregor repeated the performance and he is the only exhibitor who has yet succeeded in winning this Championship in two consecutive years. F. W. Crawford, Winnipeg, Man., is Secretary.

It is recognized by most people that there is a place for these three beef breeds, Shorthorn, Hereford, and Aberdeen-Angus. No one breed could satisfy all, or even a majority of the breeders. These cattle have all been brought to a condition bordering on perfection and are the pride of the people who own and breed them.

Canadian Feeder Cattle The Canadian climate is particularly suited to the production of beef cattle. Warm countries are nearly always infested with dangerous cattle diseases. Canadian Winters add greatly to the health and vigor of our cattle and corn belt feeders in the United States and Scottish feeders in Britain, strongly favor Canadian cattle for feeding, as they have good vigorous appetites and generally carry that robust constitution, without which feeder cattle do not make satisfactory gains.



THOMAS McMILLAN, M.P.

We are pleased to be able to present to our readers the opinions and experiences of Thos. McMillan, M.P., of Seaforth, Ontario, one of the most successful and progressive livestock men and farmers in the Province. Mr. McMillan has been feeding cattle for the home and export market for almost half a century. For six years the McMillans topped the Glasgow market for imported fat cattle, and very frequently Mr. McMillan secures a premium over the market price for his steers when he sells them. Of late years he has not been feeding so many, but has eighty head

on feed this Winter. With respect to feeding steers, Mr. McMillan says:

Feeding Steers for the Beef Market in Canada

"The first requirement of every business is 'The man behind the gun.'

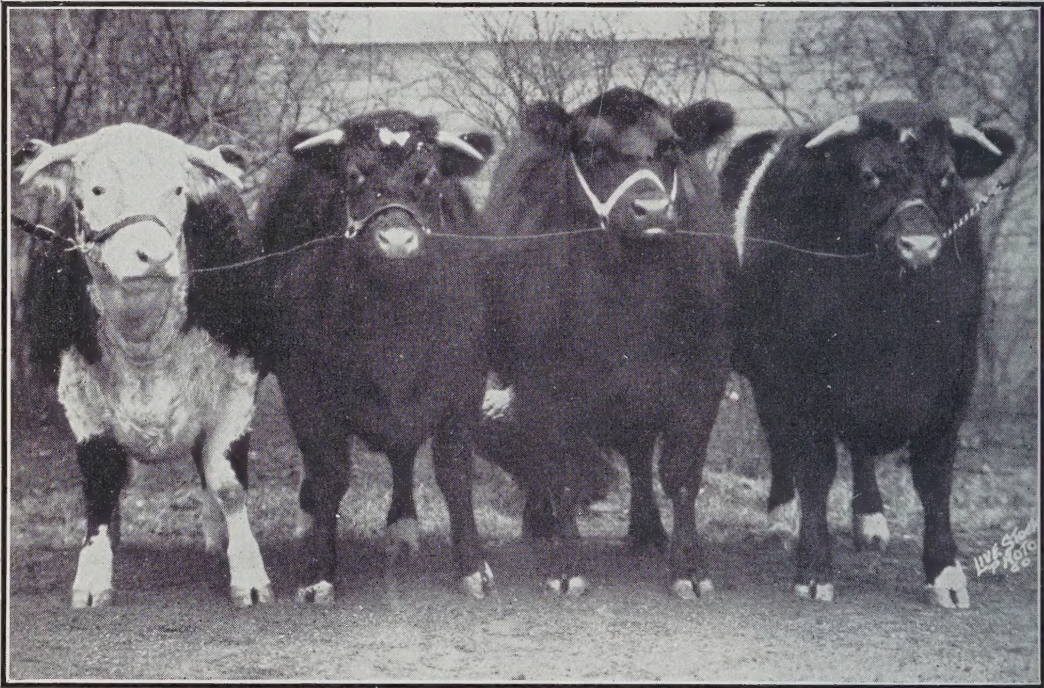
Show me an individual who has been successful along any particular line for any considerable time and, while I may not know him, I can point to him as one who has put into his business the necessary energy, perseverance and brain power which, when properly directed, will produce success in any line.

"This is pre-eminently so in all lines of Agriculture, as it is in the science and practice of steer-feeding.

"The real livestock finisher will procure the desirable young thrifty animal (of the beefing breeds) usually indicated by a nice, clean-cut head, broad fore-head, full, bright, mild eye, wide, open nostrils, good heart-girth, straight and smooth over the back and loins, well filled breech, with good development along the bottom of body, on short legs, and with velvety skin. Cattle for feeding must show ability to develop their fleshing by being in good thrifty condition when purchased. Half-starved looking animals are neither desirable nor profitable to purchase, they are usually dear at any price. Buy feeders in good condition, which is an indication that they are good thrivers and are easy to flesh.

“In feeding, we must realize that the first office of food is to supply the wants of the animal system, and it is only from the extra portion given, which can be properly digested and assimilated, that a profitable return is obtained. Therefore, the animals should receive such full and appropriate rations as will always satisfy but never unduly distend or inflate. The food given should be entirely cleaned up at every meal, and leave the animals in such condition that proper digestion and assimilation will take place and keep them lively and ready for the next meal.

“No individual can tell another just how much concentrated food an animal will take and continuously make profitable use of. That must be determined by experience. There is much in the expression ‘The eye of the master fatteneth his cattle.’ The real herdsman will be punctual and observant. He will watch the animals carefully, observe the character of their droppings, which indicates whether or not the food is being



Prize winning steers fitted by the University of Alberta. The steer on the right was grand champion at the Royal Winter Fair, Toronto and Shorthorn champion at the Chicago International

properly digested, and notice at once if any animal is not in his usual sprightly condition.

“Regularity of feeding periods, kindness and cleanliness in and about the stables are invaluable and must be strictly observed. The animals should have free access to good, fresh water and salt.

“Other considerations such as quality and composition of foods, and when to have his animals ready to strike the best market, press themselves upon the feeder as he places his animals in the feed-lot. Sweet Clover or corn for silage and roots (manels or turnips) should be grown in a proper rotation for feeding. These provide desirable succulence as well as nutriment, and should be fed in a mixture of cut straw and ground mixed grains with mill feed (bran and shorts). With this ration, oil cake and cotton-seed meal, fed judiciously) are valuable towards the close of the feeding period. These foods with good Alfalfa, Alsike and Timothy hay, fed in such proportion as to make what is known as a well-balanced ration, should carry the animals to prime condition at the desirable period of marketing.

“When the animals are taken from pasture to the feed lot, they should at the start be given bulky food without much grain. After forty-nine years continuous fattening experience, we observe the following practice: every morning directly after feeding, mix (for the evening and morning meal) sufficient cut straw, silage, pulped roots (if you have any) with $1\frac{1}{2}$ lbs. ground mixed grain and mill feed per animal. 6 a.m. feed one-half of this mixed ration. When this is finished, follow with as much hay as will be eaten clean. Mix your ration, as indicated, sweep the feed passages and let the animals rest till evening, when the morning's ration is repeated, finishing up about 6 p.m. In feeding this way, we believe twice a day is sufficient.

“As the feeding period advances, gradually increase the quantity of grain, reduce the bulk of cut straw and silage, giving more hay instead. In this way, carry them along strong to the finishing period, always being careful (particularly in stable finishing) to keep the animals going, by gradually increasing, rather than at any time diminishing the heavy meal ration. In general feeding, we never give more than about ten pounds of grain per day to each bullock. Of that quantity not more than

1½ to 2 lbs. is oilcake and one pound cotton seed.

"Gentle exercise is desirable. For that reason and to lighten the labor, the animals are better if kept loose in the feeding compartments and graded according to size and condition. We prefer not more than six to ten head in each compartment.

"The loose boxes should be cleaned and bedded at least two or three times a week.

"To guard against lice, mix a little sulphur with the feed about three times a week when the animals are first stabled, and if they are noticed itching themselves, sprinkle along the back with a mixture one part helebore to five parts cement or other heavy, powdery material.

"Our long experience has taught us that we can usually strike a better market in the month of July than at any other season, and finish on the grass. In this practice, we never feed more than four to six pounds per day of grain mixture during the Winter. It is a safer system of feeding, is not more expensive will give greater average gains, and usually enables us to strike a better market.

"When the cattle go on the grass we reduce the grain ration until they become accustomed to the new feed, then gradually increase it again up to about 6 lbs. per animal. We have found bran and oilcake an excellent mixture to feed on the grass. If the grass is good, steers will make good gains and make them more cheaply than in the stable. We have had odd steers make gains of as much as 5 lbs. per day when fed on the grass, but this is by no means an average. We have made average gains during the season's feeding of 275 and 300 lbs. while we have had single steers put on as much as 500 lbs."

Chapter XIII

DAIRY CATTLE

THERE are four breeds of dairy cattle in Ontario and the Prairie Provinces. There are a few individuals of some other breeds but those that are by far the most prominent are: Holstein-Friesians, Ayrshires, Jerseys and Guernseys. Each one of them has a place in the dairy economy of these provinces and each has its enthusiastic advocates. Locality, climate, crops, grass, and other farming conditions, as well as the breeder's personal fancy must largely determine which one a man shall choose, and a few breeders are operating herds of more than one breed. The latter is not usually a good plan, but a man may have an object in view when doing so and he is entitled to the privilege.

We are giving some information about these four breeds and, as in the case of other livestock, regret that our space is so limited.



Oakhurst Colantha Abbekerk grand champion at Toronto Royal Show for Mount Victoria Farms.

Holstein-Friesians The Holstein-Friesians greatly outnumber the other dairy breeds in Canada. These black and white cattle first came across from the United States less than half a century ago, and it was in 1883 that the Holstein-Friesian Association for Canada was organized. Smith Bros., of Eldorado, near Brampton, Ont., were among the first breeders, and one of this firm was the first secretary of the association. Later Mr. Clemons became Secretary and he was succeeded by his son W. A. Clemons of Brantford, who is Secretary of the Association at the present time.

Holsteins had been bred in the United States for some thirty years previous to coming to Canada and had made great progress on the dairy farms of that country. These black and white cows were heavy milkers and soon began making records that astonished dairymen all over the world.

There were two great Holstein-Friesian bulls, owned near Syracuse, N.Y., that did much for the breed twenty or twenty-five years ago. These were King Segius and King of the Pontiacs. This "pair of Kings" almost dominated the breed for a time, and later a bull that combined the blood of both, called King Segius Pontiac Alcarta, made a great impression upon the Holsteins of his day.

Sir Admiral Ormsby was a bull that worked great improvement in Ontario, but so many illustrious breeding bulls have followed him that it is impossible to mention them all.

May Echo was one of the first Canadian cows to make a world's record. She was the first cow to milk over 100 lbs. per day for seven days, giving in that time 726.6 lbs. of milk, making 31.34 lbs. of butter. She also made a yearly record of 23,707 lbs. of milk and 1,042.05 lbs. of butter, her test for butter fat being 3.51. This great cow was the mother of May Echo Verbelles a cow with a fair record, but her greatness was in her heifer calf, May Echo Sylvia. This daughter made a seven day record of 1,900.5 lbs. of milk, and a 100-day record of 12,898 lbs. of milk.

May Echo Sylvia was the mother of "Carnation King Sylvia" bred by Hon. Senator Hardy and sold at public auction, in Milwaukee, to the Carnation Milk Co. for \$106,000.00, a record price for a bull calf that has not been, and may never

be equalled.

There are a number of families equally illustrious among the Holstein-Friesians of Canada, but it would be difficult to enumerate even part of them here. The Holstein is a dairy cow of great scale and capacity. She is a good feeder and a heavy milker and in cheese factory districts soon became very popular.

Some years ago many Holsteins did not yield a heavy percentage of butter fat, but selection in breeding has remedied this. The original Holstein was a rather homely cow, but straight lines and symmetry in form have come by the same route as increased butter fat production.

The making of world's records in the production of milk and butter has become almost a habit with the Holsteins. These great black and white cows seem to have almost unlimited capacity for converting feed into milk. Twelve Holstein cows in Canada have each given over 30,000 lbs. of milk in twelve months, and twenty-five Holstein cows, bred in Canada, have each produced over 1,000 lbs. of butter fat in one year.

A world's record for butter production in 365 days was made by the Raymondale Farms' cow, De Kol Plus Segis Dixie. She gave 33,529 lbs. of milk testing 4.13% and making 1,730 lbs. of butter. Another world's record for butter in the four year old class for 305 days, was recently completed by a Holstein cow owned by B. H. Tomson, of Moose Jaw, Sask. This cow, Canary Korndyke Alcartra, gave 26,396 lbs. of milk in 305 days testing 4.9 percent and making 1,350 lbs. of butter. It will be observed that both these cows, though heavy milk producers, have remarkably high tests for butter fat. In reckoning the yield of butter in each case the 80% of fat rule is observed.

This Holland breed has improved on this continent, and there is no doubt that there are much better Holsteins in Canada and the United States, than can be found in their native land. They are, of course, bred here in much larger numbers.

Breed enthusiasts always make great claims for their favorite cattle, but the rapid increase in numbers is proof of the popularity of these black and whites with a great many Canadian farmers. They are good crossing cattle for dairy purposes and a few years use of a Holstein bull will make a very

substantial change in a herd of ordinary cows. There is an important place for the Holstein in the livestock farming of Canada, and she is making very rapid progress.

Ayrshires Ayrshire cattle are a purely Scottish product.

“Auld Ayr wham ne’er a toon surpasses,
For honest lads and bonnie lasses.”

Aye, and the Ayrshire coo is a bonnie beastie, for a Scotsman’s love of beauty in his farm animals has always carried him far.

It is claimed that some two hundred years ago Ayrshires were bred in their native district in Scotland, but many changes and improvements have been wrought in the breed during the intervening years.

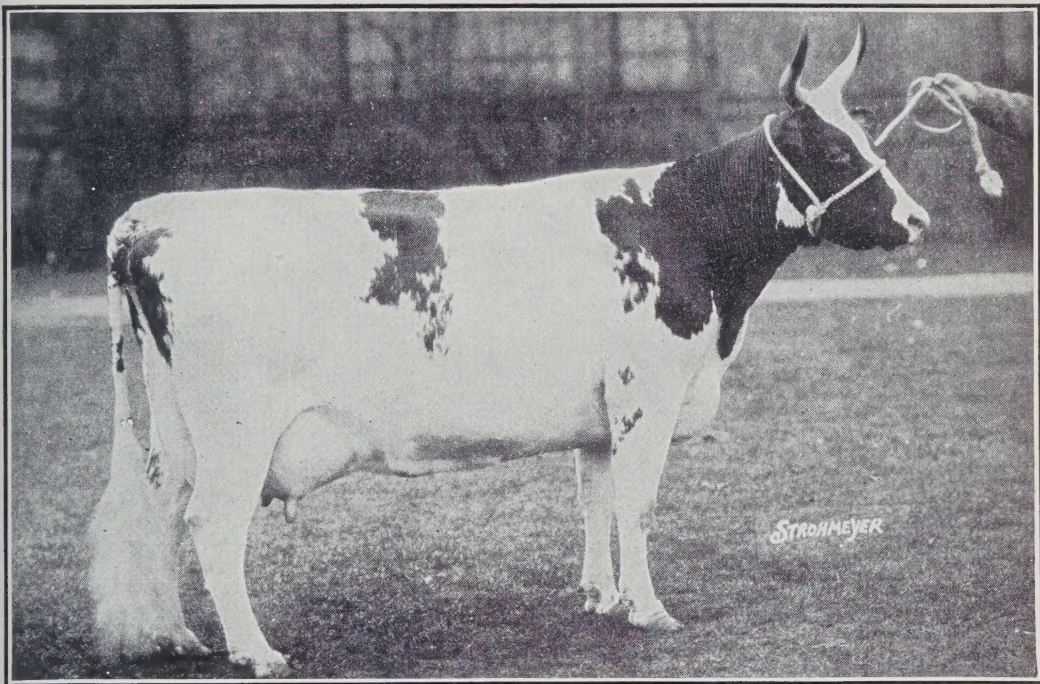
Many years ago Ayrshires were mostly of a darker color, being brown and a good many nearly black. White has been more favored as a color in recent years and they might often be described as white with brown markings, instead of brown with white markings.

Ayrshire cows first came to Canada on passenger ships to provide milk during the voyage as early as 1821. It was nearly a half century later, however, before any importations were made for dairy purposes in Canada.

Hon. H. M. Cochrane was among the first importers, in fact, there were not many British breeds that Senator Cochrane did not bring to Canada. Hon. J. J. C. Abbott, one time Prime Minister of Canada was also a breeder of Ayrshires many years ago.

The first herd record for this breed was organized in Canada in 1870 and the first Herd Book was published in 1886. For twenty-one years, W. F. Stephen was secretary of the Ayrshire Association, and was recently succeeded by Frank Napier. The office is at Huntingdon, Quebec. Like some other pure bred records there were two Ayrshire herd books at one time but later they were merged into one.

Among the list of members published in the first herd book is that of the late Robert Ness, of Howick, Quebec, who for many years, along with his son R. R. Ness, was the largest importer of Ayrshires in Canada. Famous prize winning and breeding bulls in the United States, like Beuchan Peter Pan, and



Springburn Lady Beauty 2nd, imported by Gilbert McMillan, grand champion Ayrshire cow, Royal Winter Fair, 1928 owned by F. C. Biggs and Son, Dundas, Ont.

Hobsland Perfect Piece, came through their hands.

In recent years, Gilbert McMillan, Huntingdon, Quebec, and J. H. Black, Lachute, Quebec, have been regular importers. The Ayrshire cow fills quite an important place in the dairy farming of Canada. She is a good producer of milk with a fairly high average in butter fat, is an easy keeper and, consequently, a profitable cow. Raised in a chill climate the Ayrshire is not a hot house plant but is a good, rugged cow around a barn yard. With graceful beauty in her lines, flashing horns, trim appearance, and beautifully balanced udder the Ayrshire is very attractive on parade.

Ayrshires have contributed some heavy milk and butter yields to the Canadian records. Nellie Osborne of Elm Shade 16th, a cow owned by W. C. Wylie, of Howick, Quebec, gave 23,223 lbs. of milk in 365 days, testing 4.32 and making 1,253

lbs. of butter. Briar Lass, owned in Quebec, by the Dominion Experimental farms, gave 22,035 lbs. of 4.44 milk in 365 days, making 1,223 lbs. of butter. Rosebank Pride, owned by Geo. Pearson & Sons, of Waterdown, Ont., gave 18,112 lbs. of milk in 305 days, testing 4.28 and making 968 lbs. of butter. It is, however, for the average production of the whole herd with ordinary twice a day milking and fed upon pasture alone that the Ayrshire depends for its popularity.

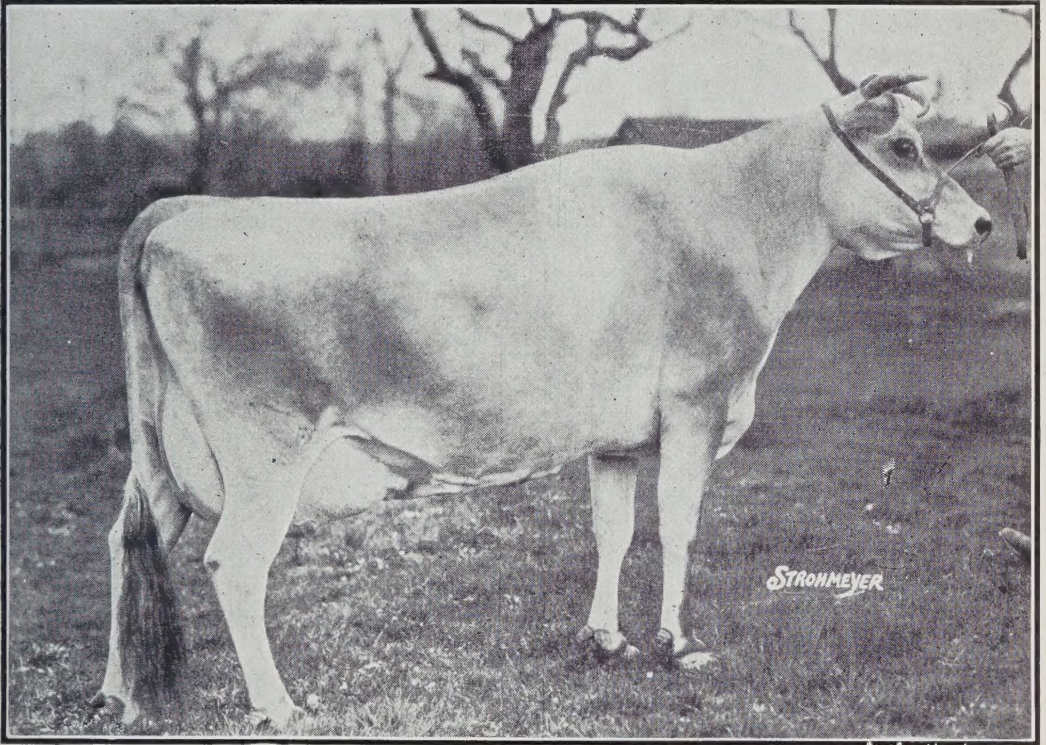
For a time in Scotland the Ayrshire was bred to such an extreme of show yard beauty that she was in danger of losing a good deal of her utility. The show cow had usually a trim, tight udder with short teats, which were not a good feature for the dairy. The Scottish breeder was just thrifty enough, however, to rescue his cows in time from this tendency, and large, well balanced udders with good sized teats, have been the aim of every progressive breeder in recent years. In the process of breeding for show yard form, however, the Ayrshire acquired a beauty and attractiveness, a straightness in her top line, and a grace and carriage that she will not easily lose and is one of her assets now, as every boy on a farm likes a beast that is good to look at.

Evenly balanced udders with well placed teats is an Ayrshire characteristic to-day. Ayrshire milk carries a good percentage of butter fat and is often referred to as 4% milk. The advocates of the breed claim it is a very well balanced milk and particularly palatable.

Ayrshire victories at the London, England, Dairy Show have been rather notable during the past few years. In 1923 they won the supreme championship of the show and the group championship as well. At the intervening shows they won several supreme championships and last year they again won the Supreme Championship for individual cow and the Bledisloe Cup for best group of six cows, over all breeds.

The Ayrshire is a breed that livestock fanciers can easily grow fond of and it is playing a useful part in the development of Canada's dairy farming. They are hardy, healthy, useful cattle that will give pleasure, satisfaction and profit to their breeders.

Jerseys Jerseys are the aristocrats of the dairy breeds. Bred as they are on Jersey Island, where for over a hundred and fifty years no cattle have been permitted to land, there can be no doubt about the purity of their blood. These attractive fawn-colored cows are the sort that women rave over, but on closer acquaintance one is bound to recognize their substantial profit making qualities as well.



*Brampton Bay Xenia, sold by auction in 1929 by B. H. Bull & Sons,
Brampton for \$8,000*

Jerseys are essentially cream and butter cows. A York County farmer told us about bringing butter to the Toronto market, many years ago, in the Summer months, and finding it too soft to sell, but when a little later he bought a few Jersey cows he found the texture of his butter changed and his "prints" were quite firm when he reached the market and offered them for sale. This was the thing that first popularized Jerseys in the Toronto district.

Jerseys first came to Canada about 1868, being imported by R. H. Stephens, of Montreal. This group of cattle, consisting of about a dozen females and two bulls, came from the Royal Herd at Windsor. These cattle did well in Canada, some of them were sold into the United States, and it was cows descended from this original importation that won the dairy cattle contest for "Economy of Production" at the Chicago World's Fair in 1893, and so brought Jerseys into the lime light on this continent. From that time on "Economy of Production" has been the chief claim of these Channel Island cattle.

The Island of Jersey is a very small section of country to produce such a famous breed of livestock, as it is only 12 miles long and from 4 to 7 miles wide. It must be remembered also that Jerseys are famous on the Island of their birth as well as abroad. In fact most of the prize winners at American shows, of recent years, were bred on Jersey Island, and were imported into Canada or the United States. During the last five or six years, more Jerseys have been brought across the ocean than any other breed of cattle. Animals of high class Jersey Island breeding are in very keen demand at the present time and are commanding high prices.

B. H. Bull & Sons, of Brampton, Ontario, have been the largest importers, breeders and dealers in Jersey cattle on the continent. They began breeding Jerseys about 1880 so have been pioneer Canadians in the business. Having established important Jersey Island connections they make two or three importations each year. The late R. J. Fleming, of Toronto, was an extensive breeder and did much to promote the Jersey breed. Mr. Arthur Little, Senator E. S. Little and Ray Lawson, of London, Ont., and E. W. Nesbit, of Woodstock, are also extensive Jersey breeders. Senator Hardy, of Brockville, and J. W. Innes, of Woodstock, are breeders of both Jerseys and Holsteins. Every province in Canada has been invaded by Jerseys and they seem to thrive in all climates.

The Jersey is a very early maturing breed and heifers in milk at two years, or somewhat under, are not uncommon. Jerseys test high for butter fat, 5%, 6% and 7% being often reached. They are butter and cream cows and their yields in the record of performance are running quite high for this small

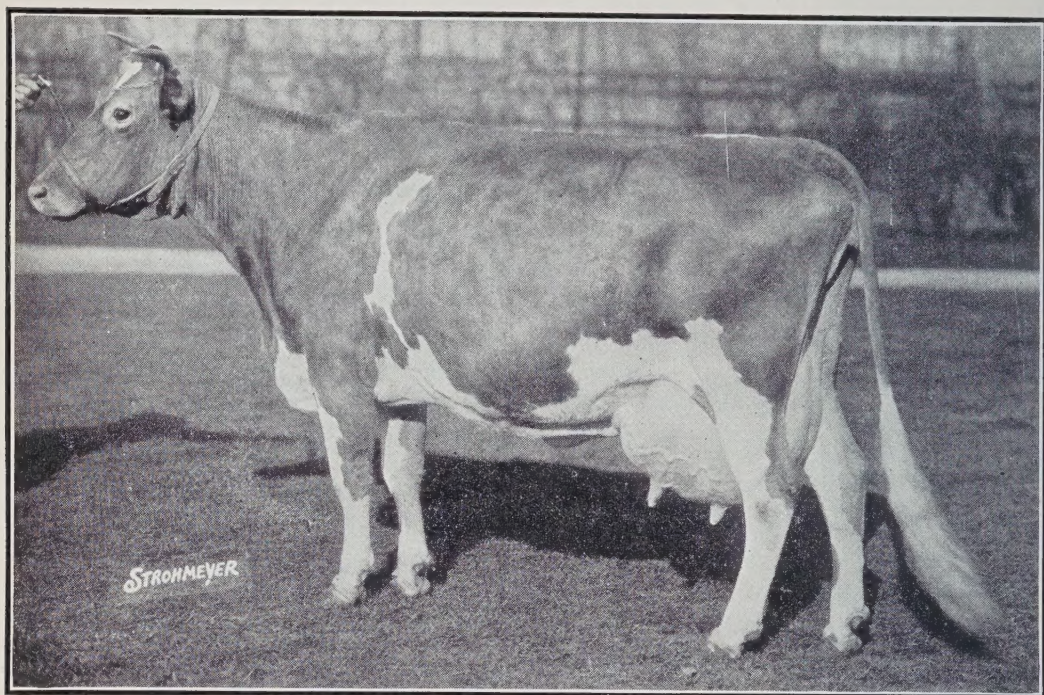
but intensely dairy breed.

The top price paid for a cattle beast at an auction, during the past year, was realized by B. H. Bull & Son, at their Toronto sale, on Feb. 5, 1929, when Brampton Bay Xenia, an imported cow, was sold for \$8,000. This cow was imported three years ago and just completed a world's record for an imported cow, of 20,400 lbs. of milk, yielding 908 lbs. of butter fat in 365 days, which on the 80% basis, would make 1,135 lbs. of butter, but Jersey breeders figure on 85% of fat in butter. This cow was sired by the imported bull, Xenia's Sultan, sold to Dr. O. W. Means, of Brookfield, Mass., for \$28,600. He was also the purchaser of Brampton Bay Xenia, and another daughter of this great bull, Brampton Excellent Paxie for \$7,500. This cow made a Canadian record of 14,100 lbs. of milk testing 6.67% and yielding 941 lbs. butter fat in 365 days. These are two remarkable records for two daughters of this remarkable breeding bull.

Numerous other good records have been made but we have only space to publish a few of each breed. Jerseys are rapidly growing in public favor in Canada. John Pringle, London, Ontario, is Secretary.

Guernseys Guernsey cattle, as the name would indicate, are natives of one of the Channel Islands. Guernsey is only a small island being about nine miles long and three or four miles wide. It is located in a mild climate, has very fertile soil and its products are chiefly horticultural and floricultural. Its breed of cattle, consequently, are not too large and are producers of rich milk on a ration limited in bulk. It is probable that at one time all the Channel Islands had one breed of cattle, and later this breed was developed in somewhat different ways in Jersey, Guernsey and Alderney. The two latter islands breeding Guernseys, as cattle bred in Alderney are now registered as Guernseys.

Guernseys are a trifle larger than Jerseys and somewhat lighter in color. The Guernsey is a very placid cow, and is often said to be the meekest of the bovine race. For some years the Island breeders of these cows did not seem to develop that uniformity of type so desirable in any breed of livestock, with the result that the demand for Guernseys was not as keen as



Lilyetta of Chicon, grand champion Guernsey cow at 1928 Royal Winter Fair, Toronto, for Don Alda Farms, Toronto, Ont.

for some other breeds.

About twenty years ago a number of wealthy men in the Eastern United States began breeding Guernsey cattle and they built up rather remarkable herds. It was the work of selection and breeding to a type, of these men, that gave Guernseys their first real boom. A few years ago they sold for record prices and have made steady progress ever since.

Guernsey cream and butter are of a golden yellow color that is not equalled by the produce of any other kind of cow. Scientists engaged in dairy research work have been endeavoring to discover the cause of this coloring, but so far without success. It has often been urged as a reason for favoring the breed, and with some success, as there is a charm about the deep, rich, yellow color of Guernsey cream. The milk of these cows tests high for butter fat. A farmer who has a considerable herd of them, and sells his milk to a city dealer, informed us recently that his average butter fat test was 5.5%. This is rich milk and finds

a ready market at good prices.

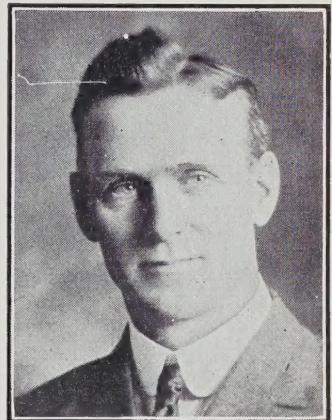
There have not been many outstanding herds of Guernseys in Canada. The Martindale herd near St. Catharines, and the Don Alda Farms' herd near Toronto, have been the two most prominent ones. Two Ministers of Agriculture have been breeders of Guernseys, Hon. Sydney Fisher, when Minister for the Dominion, and Hon. John Martin at present Minister for Ontario.

Where there is a city demand for high-testing milk, or rich, yellow cream, Guernsey milk will always sell at a premium and these cattle are bound to grow in popularity. They are good dairy cows to keep on high-priced land as they are not heavy consumers. Guernseys are butter and cream cows and they have a place in the future development of Canadian milk products.

The grand champion Guernsey cow at the 1928 Royal Agricultural Winter Fair was Lilyetta of Chiconia owned by Don Alda Farms, near Toronto. This cow was not only a grand champion but in her four year old record she gave, in 365 days, 14,051 lbs. of milk testing 4.83% making 848.5 lbs. of butter.

There are a number of successful Guernsey breeders in Nova Scotia, though Canadian farmers have not taken up this breed as strongly as they have some of the others, but American farmers have proved the worth of Guernseys on this continent and they are making steady progress. E. G. McColough, Truro, N.S., is Secretary.

Care of Dairy Cows Dairying is an important feature in Canadian Farming, and will always occupy the attention of a good share of our farming population. Mr. S. G. Carlyle who has written the following article on feeding dairy cattle is peculiarly qualified to discuss this subject. Mr. Carlyle was a student at the Ontario Agricultural College in his boyhood days, and afterwards, for a number of years, was a successful dairy farmer near Chesterville, Ontario, where he built up



S. G. CARLYLE



James Wallace, Chapel Hill, Dunrod, Scotland, judging Ayrshire cows
at the Royal Winter Fair, Toronto

an excellent dairy herd and had the great breeding bull Sir Admiral Ormsby at its head. When May Echo made the first seven day world's record she was fed and milked for the period by S. G. Carlyle. In 1913, Mr. Carlyle went to Alberta as Superintendent of the Provincial Demonstration Farms where he had several dairy herds under his supervision, and where he gained experience in the successful feeding of dairy cows in Western Canada.

At present Mr. Carlyle is Livestock Commissioner for the Province of Alberta. In discussing dairy cattle, he says:

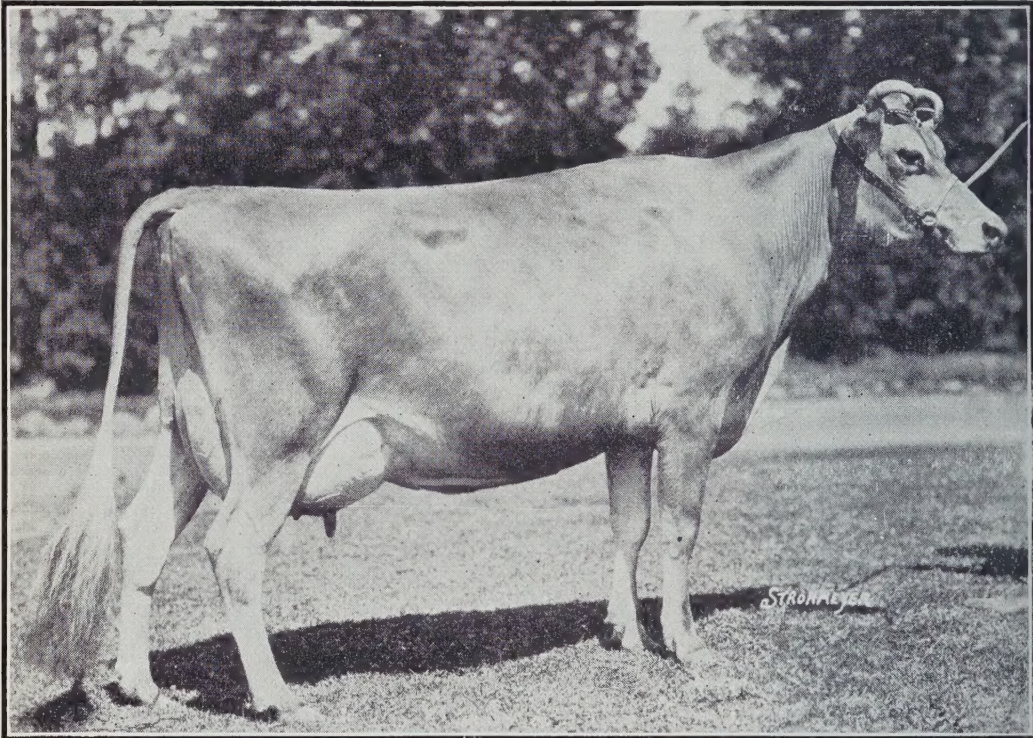
Feeding Dairy Cattle "Canada's livestock population includes a large number of dairy cattle, and some of the finest and largest dairy herds in the world are found here. Good, pure bred sires of the principal dairy breeds have been imported from time to time, and with these in the hands of men who understood their business, a great improvement in type and production has been the result in recent years.

"In the building up of high producing herds of excellent type, good feeding plays just as important a part as good breeding, and perhaps lack of feeds or a lack of knowledge of feeding is more largely responsible for low producing cows than the breeding of the individual cow or her ancestry.

"To secure the best results the feeder of dairy cattle must have some knowledge of the different feeds a cow requires. It is not necessary to work out a balanced ration in a chemical laboratory, but a knowledge of the analysis of feeds will serve as a guide as to the amounts of both roughage and concentrates which should be combined to make up the most economical ration which will meet the requirements of the average cow of the herd.

Grass the Natural Diet "Every dairyman knows that pasture grass in the latter part of June is an ideal feed for dairy cattle, both from the standpoint of milk production and the health and condition of the cow. He also knows that early Spring or May grass lacks substance and requires some dry roughage and concentrates to keep up the milk flow. Later in the season when the grass gets somewhat hard and dry,

unless fresh pasture or other succulent feeds are supplied, milk production again drops. In order to maintain the milk flow the dairyman must pay constant attention to the feeds his cattle are consuming, and as far as possible imitate June grass conditions. When pastures begin to fail, some supplement, either fresh pasture, sowed later in the season or second growth grass or clover, should be provided, or failing this, some concentrates such as oat chop and bran should be supplied. The late Summer and early Fall is an important time, as during the rush of harvesting and threshing and filling silos, dairy cows are more apt to be neglected than during any other period of the year, and if they are allowed to fail at this time their chance of being profitable producers during the Winter months is greatly decreased.



Brampton Washington Beth, imported by B. H. Bull & Sons. A typical Jersey with an average butter fat test in 305 days of 6.41%

Winter Feeding "It is during the Winter months that skill and knowledge are required if best results are to be obtained.

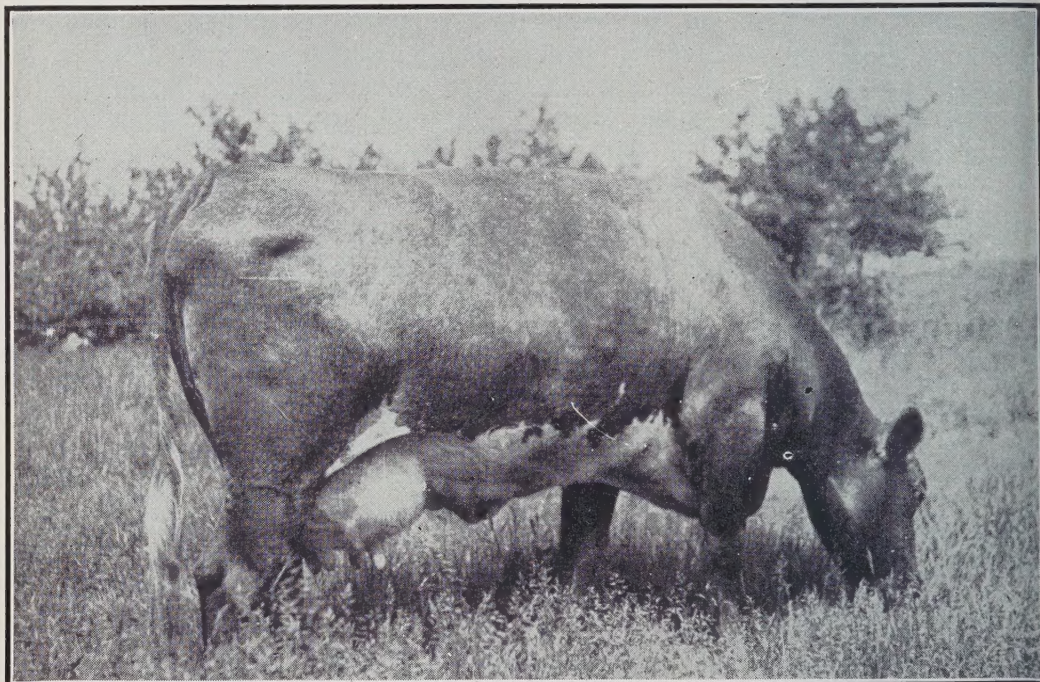
Cows are fond of a variety of feeds, especially during the long Winter months when they are stabled. The required amount of succulent feed may be supplied in the form of silage or root crops or both. In most parts of Canada silage is more generally used, as large quantities of silage crops can be grown cheaply and stored economically. Roots, while not so extensively grown as corn, add greatly to the palatability of the ration, and with cows fed heavily on concentrates for high records, make a very safe and cooling feed.

"The crop most extensively grown for silage in Eastern Canada is corn, although Sweet Clover is being ensiled in some districts where corn cannot be successfully grown or where the labor problem must be considered. In Western Canada, while corn is grown to some extent in every Province, green oats are largely used, as are also Sweet Clover and sunflowers.

Grow Your Feed "To feed economically, home grown feeds should be utilized as much as possible; this is especially true of roughages. Attention should also be paid to the relation between the concentrates and the quality of rough feeds being fed. If well cured clover hay and well matured corn ensilage formed the roughage in the ration, a smaller amount of concentrates might be fed. If Timothy hay, oat straw, green feed or prairie hay formed the roughage more concentrates would be required. This deficiency can be made up by adding a quantity of bran and oil meal.

"Concentrates which are high in protein are expensive, and if costs are to be kept down attention should be paid to the growing of roughages which supply this constituent in the greatest amount. The various clovers, fed either as hay or ensilage, fill an important place in this connection. Red and Alsike Clover and Alfalfa are chiefly used for hay. It is more difficult to cure Sweet Clover satisfactorily, and for that reason in some districts it is quite extensively used for ensilage. Its great value, however, is for use as a pasture crop, as it stands the drouth better than any of the other clovers and will supply more pasture to the acre than perhaps any other forage plant.

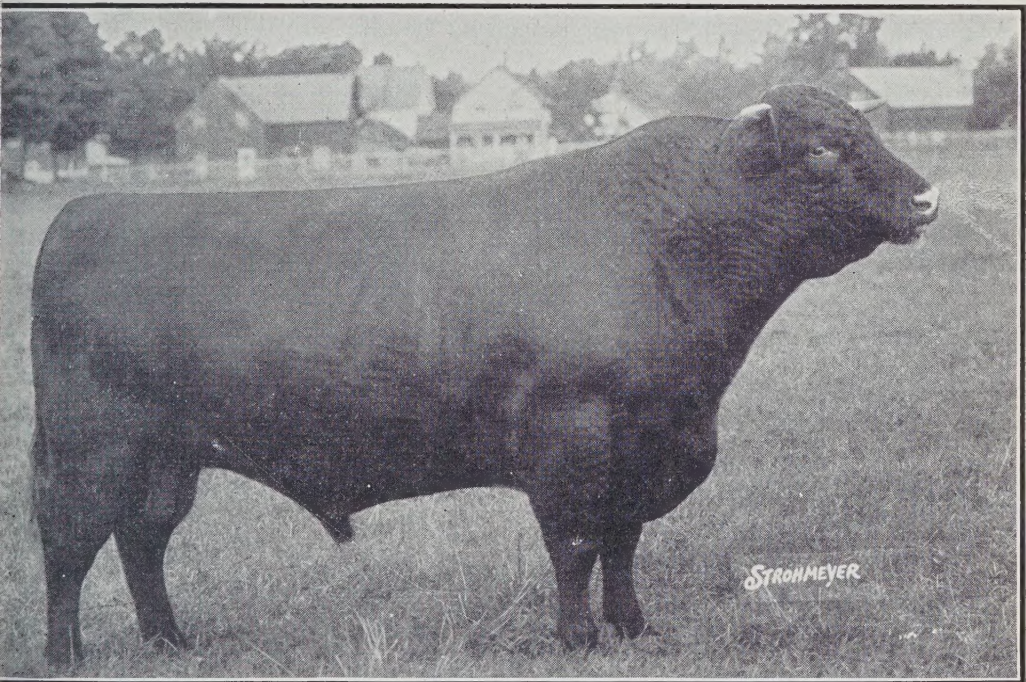
“Where Alfalfa can be grown successfully, it is acknowledged to be the best of forage plants, and very little other roughage is needed except that of a succulent nature. Protein feeds, as has been pointed out, are usually the most expensive to purchase and if these can be grown on the farm in the form of legumes, which contain a higher percentage of protein than any other home grown roughage, a big saving can be effected in the feed bill.



Miss Daisy, grand champion dual purpose Shorthorn cow 1927 Royal Winter Fair. Owned by D. Z. Gibson & Son, Caledonia Ont.

Amounts To Feed “Where the roughage consists of corn silage and clover or Alfalfa, the minimum amount of mill feeds need be purchased, and a satisfactory ration may be made up of 30 to 40 pounds of ensilage, depending on the size of the cow, and all the Alfalfa or well cured clover hay that will be cleaned up, fed twice a day. For concentrates, a ration of 3 parts oats, 2 parts bran, 1 part barley, is satisfactory, and if high production is the main object, oil cake or cotton seed meal

may be added at the rate of from 1 to 2 pounds per day. The amount of oats, barley and bran to be fed depends on the amount of milk the cow is giving, and is usually set at one pound of concentrates to every $3\frac{1}{2}$ or 4 pounds of milk produced. If Sweet Clover silage is used, less Alfalfa and clover hay would be needed, and cured green oats or other varieties of well cured hay grown on the farm, might be added. The amount of each of the concentrates required will be largely determined by the nature of the rough feed. If Sweet Clover ensilage and Alfalfa were used principally as roughage, very little bran and oil cake would be necessary, and oats and barley chop would form the bulk of the ration. Good, bright oat straw is also often used as a roughage, especially as it may serve as an agreeable change from some of the other feeds.



Fairy Duke, grand champion dual purpose Shorthorn bull at the Royal Winter Fair for Alexander Maclaren, Buckingham, Quebec.

Value of “If roots are fed they will to some extent take the
Roots place of ensilage, though both may be included in the ration satisfactorily. For cows making high records in milk production roots are almost indispensable, as they not only contribute to the milk flow but are very appetizing, succulent and have a cooling effect on the system, especially when large quantities of concentrates are being fed.

“It is not advisable to follow any hard and fast rule as the dairyman must make the best use of the crops grown on his own farm, but he should have an intelligent knowledge of the comparative value of the feeds that are available and then only buy the supplements that are necessary to balance the ration.”

*Chapter XIV***SHEEP ON THE FARM**

THE keeping of sheep on Canadian farms is not as popular as it should be. Some increase in numbers has taken place in recent years, however, and is likely to continue. It is calculated that the sheep population of Canada to-day is about 3,648,000, which is about 890,000 more than it was five years ago.

Dairying has been steadily growing in importance in Canada, and the dairy farmer does not like to have his pastures eaten down by sheep. There is no line of livestock, taking one year with another, that will pay better than sheep. Some years ago we heard Mr. W. A. Dryden, of Brooklin, Ontario, remark that in a long period of farming, as carried on by his father, and himself, the most consistent money-makers on their farm were sheep.

Keeping a few sheep will fit in with the business of almost any farmer, and if the farm is inclined to be weedy you can depend upon the sheep to do their share in cleaning it up.

Not Merely Scavengers While sheep will help to clear up weeds it is a great mistake to keep them simply as scavengers and neglect to feed them well. It always pays to feed good livestock. There is a lot of roughage and screenings, from cleaning grain, about every farm that sheep will do well on. If peas are being grown, the sheep can be fed pea straw for roughage. Alfalfa, and Sweet Clover hay are also good feed for them, but both should be cut just after the blossoms are open to get the best food value from the leaves. Oats and peas sown together and cut green make good sheep hay. Turnips are excellent for sheep. A mixture of oats and bran is the best grain ration for breeding ewes. They should not be fed barley, rye, corn, or oil meal. Silage can be fed with success but care must be taken not to feed any that is mouldy.

Winter Quarters Sheep want dry quarters but not a very warm place. If there is a large opening on the south side and they can have freedom to run out and in, so much the better. They should not be confined too much. The door should be wide so that the sheep will not easily get jammed in it as



Carlot Southdown lambs, grand champions at the Chicago, International for Col. Robt. McEwen, London, Ont.

they all run for the door together if alarmed.

Keep them dry and have their pen airy and well ventilated, with room enough for the flock to move about comfortably.

Lambing pens should be provided so that ewes may be moved away from the flock before they drop their lambs and be kept apart until the lambs are strong enough to find their mothers without fail, in the flock.

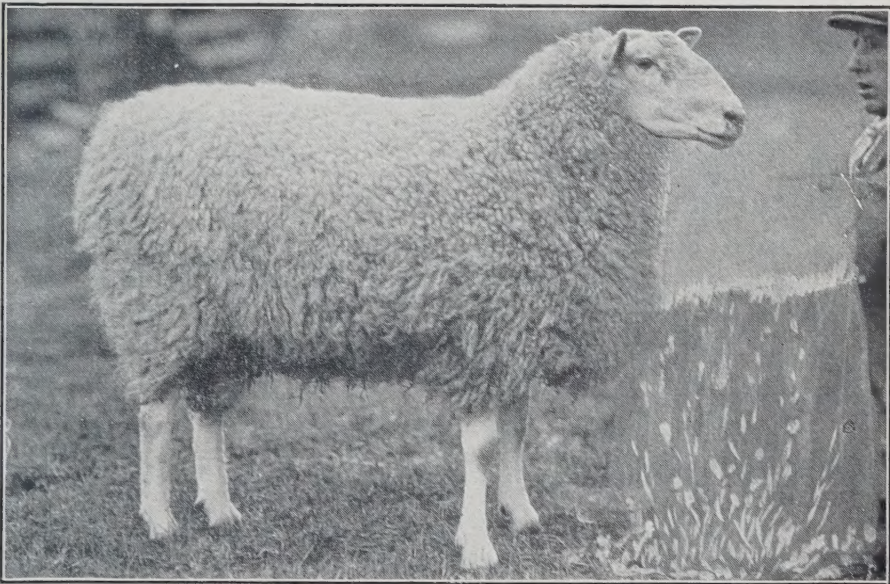
Keep the sheep in the house on a wet day in Winter, or when a bleak, cold wind is blowing. If allowed to run out and get their fleeces soaked with rain, they are liable to get colds and possibly pneumonia. Keep them away from straw stacks where they will get their wool filled with chaff and so reduced in value at shearing time.

Care at Lambing Time The gestation period for sheep is about 146 to 150 days. The saving of lambs is the most important feature of the business, and when these are born on cold or wintry days the man who cares for the

sheep better be on his job. See that all new-born lambs have been nursed and so nourished against the business of beginning life. Don't neglect this! Quite often lambs are born weak and so must be helped to their first breakfast. Frequently a weak lamb may look almost as though dead, but if its mouth is cleaned off and the shepherd will hold its mouth open and blow gently into it he may start it breathing, then if he lays it down with its back up and strikes it slightly, with both hands, just behind the front legs he may start heart action. A well known shepherd, Frank Kleinheinz, of Wisconsin University, says he has frequently revived lambs in that way that appeared to be dead.

Chilled Lambs There is always danger in cold weather, of lambs becoming chilled, and the strongest ones are not immune from this. A hot bath in a pail or tub of water, as warm as your hand will stand it, is a good reviver. A lamb should be dried with a warm cloth and kept near a stove for a while.

A hot water bottle is a good helper at warming up the youngsters, but it should be wrapped in flannel, as boiling water



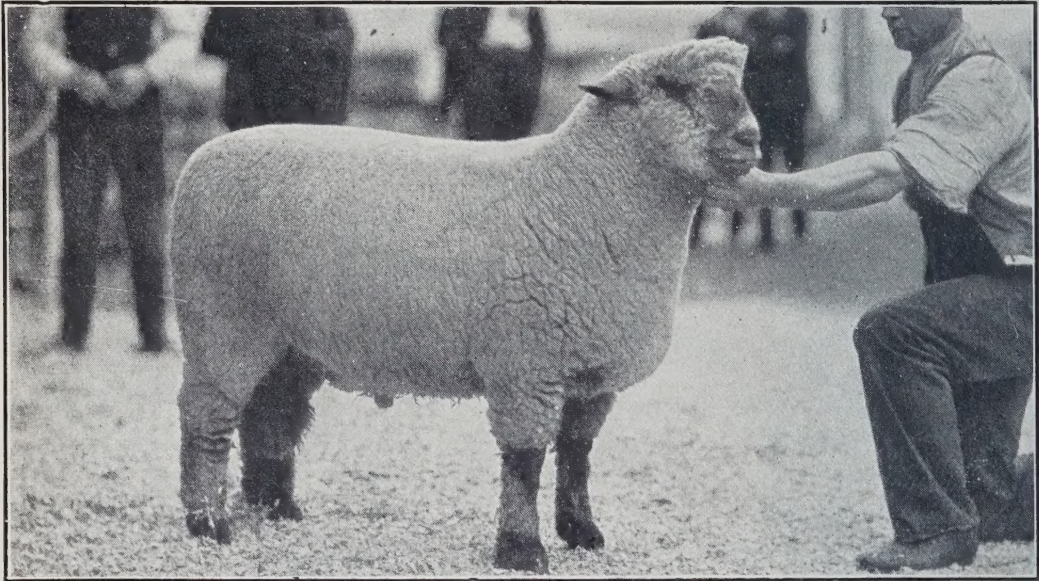
*Champion Leicester ram at Canadian National Exhibition
for Jas. Snell, Clinton, Ont.*

makes the rubber very hot. A few drops of whiskey in a little warm water will stimulate heart action, and fortunately cannot teach the sheep a bad habit. A chilled lamb may require to be given a teaspoonful of castor oil a few days later.

Adopted Lambs If a ewe has a single lamb, and it dies, another lamb may be put on her by skinning her lamb and tying the skin over the one you wish her to adopt. The ewe is a discriminating mother and won't take any lamb but her own, but the only method she has of recognizing her lamb is by its smell and voice, so she can be fooled in this way as she may have heard no voice from her lamb. Remove the dead lamb's skin from the living lamb in, at the most, 48 hours. Sometimes a ewe will adopt a lamb without any trouble, but not often.

Feeding Ewes The ewes that have lambs should get some succulent feed like turnips and ensilage, and some days after lambing, a little grain.

Ewes should be trimmed of all tags of wool and observed to see that they are feeding their lambs. Lambs may be raised by



*Champion Oxford ram at Canadian National Exhibition
for Estate of R. J. Fleming*

hand on cows' milk in case their mother dies. They should be fed very little milk at a time and fed often. The milk should be high in butter fat and **one** cow's milk only should be used. The profit in raising a "pet lamb" is a very doubtful matter.

Docking Lambs All lambs should be docked at from eight to fourteen days old, and the tails should be severed with a pair of heated pinchers made for that purpose. Leave about an inch of tail. You can cut off the tails with a sharp knife, but some lambs are apt to bleed to death, and once you have used the docking pinchers you would not consider any other method.



*Champion Lincoln ram at Canadian National Exhibition
for Herbert Lee, Highgate, Ont.*

Unless you are breeding pure bred sheep to sell for breeding purposes all ram lambs should be castrated five or six days after being docked. Don't neglect this or in the Autumn you will find that your ram lambs will have to be sold at from \$1.00 to \$2.00 per head less than if it had been done.

Sheep in Summer Give your sheep plenty of run, they need change of pasture also, and you will find them well worth

feeding. Clip your sheep in good time, preferably in early May or sometimes sooner. Watch any cold wet time afterwards and give them shelter. It is much better than having them carry about a heavy fleece in warm weather. If any of them begin to lose their fleeces early, clip them and put on a light blanket made from an old piece of sacking, doubled.

Get instructions about clipping, tying and shipping wool from the Canadian Co-Operative Wool Growers' Association, Toronto. This information will be readily given you and it will be found to be very useful.

Dip Your Sheep At least once a year sheep should be dipped, and probably the best time to do it is right after shearing.

The sheep division of the Livestock Branch of the Department of Agriculture at Ottawa, will be pleased to give you all the desired information and instructions relative to this, if you write for it.

At shearing, is a good time to look over the feet of your sheep, and attend to any trimming of hoofs that may be found necessary.

Weaning Lambs Lambs should be weaned at from four and one half to five months, as the breeding ewes require a rest.

Lambs should be turned into a good pasture at weaning time, a second crop of Alfalfa makes good feed for them. Be sure to see that both lambs and sheep have access to both salt and water at all times. Sheep are not heavy drinkers, but it is a great mistake to think, as some do, that they do not need water. Like other livestock they need it all the time.

Intestinal Parasites Stomach worms in sheep are among the enemies the flock master has to fight. Changing pastures as often as convenient will act as a preventative.

Sheep infested with these worms fail in flesh, walk behind the rest of the flock, drop their heads and have a dejected look. They look like, and are, sick sheep.

There are several effective treatments, all of which are easily administered, and if taken in time, quite effective.

One treatment is to drench each sheep with this mixture:

- 5 ounces of cow's whole milk
- 2 tablespoonfuls of gasoline
- 1 tablespoonful of raw linseed oil

Each dose should be mixed separately, and shaken up well before drenching the sheep with it.

For lambs use only from 1 to 1½ table-spoonfuls of gasoline, depending on their age and size.

Another remedy is to dissolve one quarter of a pound of Copper Sulphate in half a gallon of hot water. Use only clear blue crystals of the Copper Sulphate, discarding any that has turned white. The best way to do this is to tie the Copper Sulphate in a muslin bag and suspend it above a jar of hot water to just touch the water. You will have a solution very quickly. The water must be in a glass or earthen vessel, as it must not touch metal. Add cold water enough to make your quantity up to three gallons. Mix into it about one quarter of a pound of good mustard. Stir the whole mixture well and give adult sheep about 4 oz. as a dose and lambs from 2 oz. to 3 oz. This quantity will drench 100 sheep allowing for waste. If your flock is smaller, mix less quantities in the same proportions.

Before drenching the sheep they should be starved about eighteen hours, and they should be kept off feed or water for about four hours afterwards. Pregnant ewes should not get this treatment at all.

Drenching Sheep To drench a sheep get a bottle with a long neck, a ginger ale bottle will do. Back the sheep into a corner, but keep her in plain sight of the rest of the flock, as sheep are more alarmed when alone, then raise her head with your left hand under her jaw and you can easily feed her the mixture from the bottle. If the sheep coughs, stop, and in any event stop to let the sheep breath once or twice in the process.

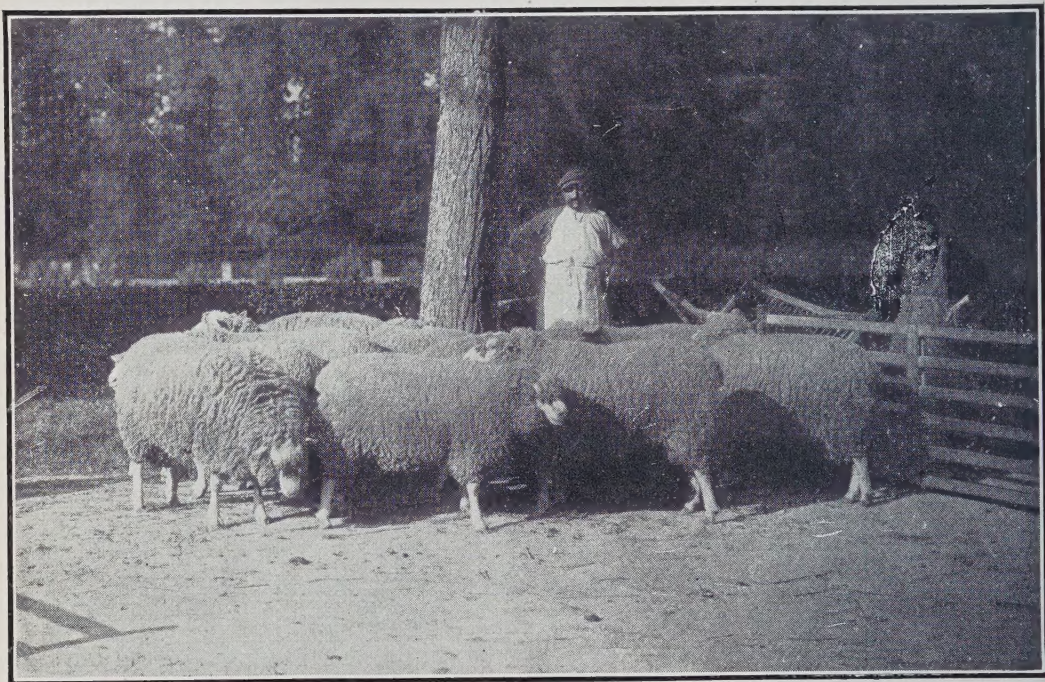
Goitre in Lambs Goitre is a common ailment in lambs. Painting the enlargement two or three times daily with tincture of iodine will often remove the goitre, but the best plan is the preventative one. Giving the ewes a variety of feed

and plenty of exercise is a good preventative, also the feeding of iodine salt is regarded as being quite effective. Salt blocks treated with iodine can be readily purchased and it is a good plan to keep such salt within reach of breeding ewes all the time.

Breeds Sheep might be divided into three classifications:

Fine Wools: The American Merino, The Delaine Merino, The Rambouillet, Some grades of Market sheep.

Medium or Middle Wools: The Shropshire, the Oxford,



Dishley Merinos in France

the Hampshire, the Southdown, the Dorset Horn, the Cheviot, the Suffolk, the Tunis.

Long or Coarse Wools: The Cotswold, the Lincoln, the Leicester, the Romney Marsh or Kent, the Black Faced Highland, the Corriedale.

In Canada the fine wool breeds have been used mostly on the range in the Prairies. The American Merino has had the

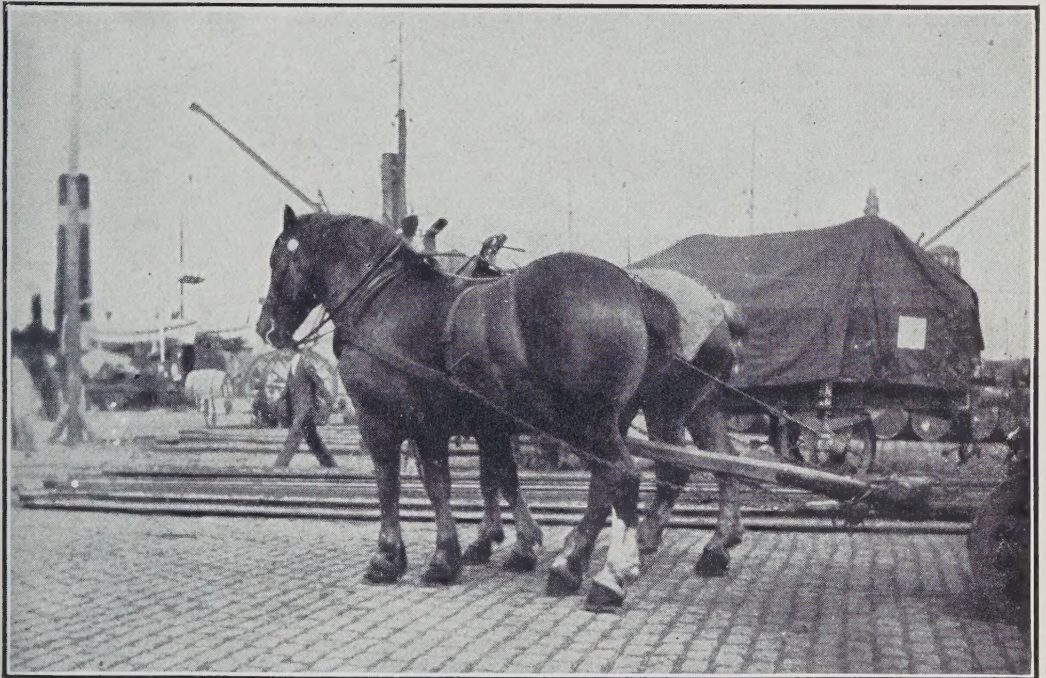
herding instinct bred into it for many generations and so it is a good sheep to raise in "bands" on the range. Ordinary barnyard sheep do not take kindly to these conditions.

Some Rambouillet sheep are also bred in the West and have been used as rams for improvement on Merino ewes.

In Medium wools the Shropshire, Oxford, Southdown, Hampshire and Suffolk have all been bred with success. The first three have been the most popular in the past but Hampshires and Suffolks have a number of friends.

All these breeds are good for crossing and work great improvement in both the wool and mutton of common ewes.

In long wools the Cotswold, Lincoln, and Leicesters have been favorites and in the early days of Canadian Agriculture were the most common sheep to be found here. The recent keen demand for long wool, for the manufacture of felt for paper mills, has placed a premium upon Canadian long wool. It is the best for this purpose of any wool produced.



*Belgian geldings on the streets of Antwerp,
July 31, 1914, the day war was declared*



Berkshires bred by E. Brien & Sons, Ridgetown, Ont. Two of this litter are now in Minnesota, two in Alberta and two in New Brunswick

Chapter XV

HOGS

BREEDING and feeding hogs has always been an important feature of Canadian farming. Many districts that have turned to dairying have also developed hog feeding, as these two lines of agriculture are often pursued together. We have, for many years, produced a substantial surplus of pork products over our home demand so that the export market has governed the price and the class of hogs desired. In 1926, Canada exported hams and bacon to the value of \$28,590,000 and of that amount almost \$28,000,000 went to the British market. This at once indicates what we must have in mind in breeding and feeding hogs in Canada.

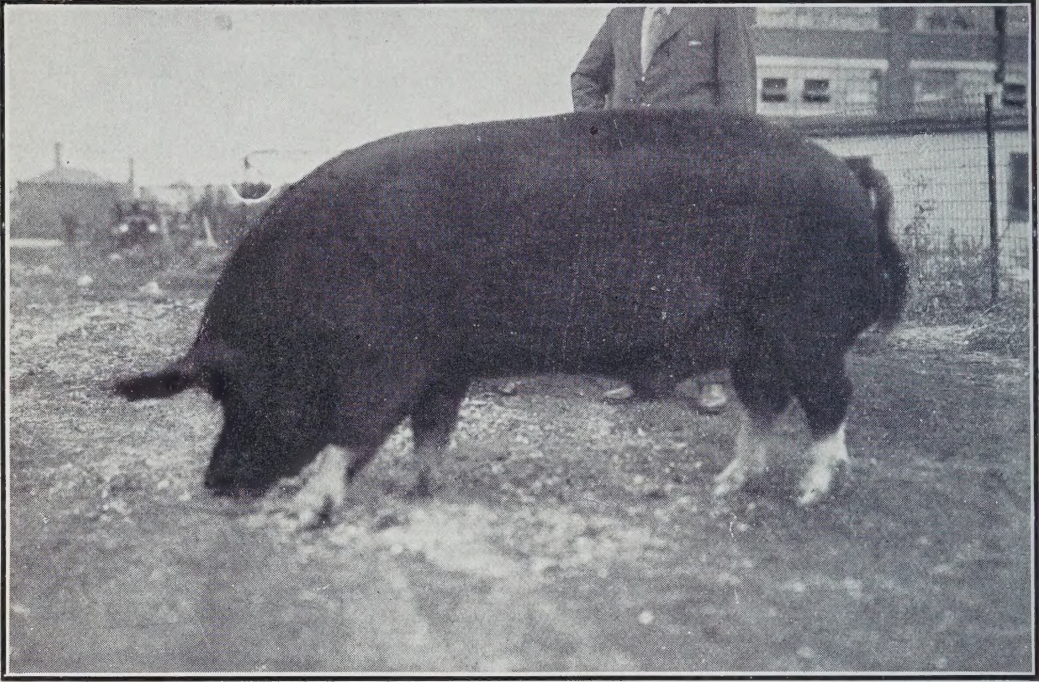
A Discriminating Market The British market is always a discriminating one in the purchase of foodstuffs.

It only pays a top price for that which measures up in quality to what its customers want. Some years of experience have shown us that the most profitable way to place pork on the British market is in the form of "Wiltshire Sides." It then becomes our business to breed hogs suited to this purpose. Denmark commands the highest price for Wiltshire Sides on the British Market which indicates to us that the nearer we can approach the Danish breed in type and conformation the better.

Bacon Breeds We have three breeds of hogs in Canada that produce a desirable quality of bacon, the Yorkshire, the Tamworth and the Berkshire. Of the latter breed we have developed in Canada a bacon type that really belongs to this country.

Government Grading The Federal Department of Agriculture established, some few years ago, a grading system under which bacon hogs should be marketed.

Any system of grading live stock is difficult to carry out, in spite of this, these plans of the Department have worked very



Grand champion, bacon type, Berkshire Boar, at Toronto Royal Winter Fair, bred by E. Brien & Sons, Ridgeway, Ont. Owned by Don Alda Farms

well. They are under revision at the present time and will be improved, but they have already produced a good effect upon the class of hogs raised in Canada.

Breeding Pigs Breeding hogs successfully is a business that requires great care and a pretty thorough knowledge of pigs.

No part of farm operations has been done more carelessly, and none will respond in results and profits more quickly to care and attention. Breeding sows must not be devouring grain all the time, it is not good for them and it costs too much. Arrangements should be made to winter brood sows largely upon roots, and they should have only a small grain ration. They should also have plenty of exercise and never should be "penned up."

Housing Pigs Expensive pig pens are not necessary. It may be all right to have fattening pens in which to put hogs up to finish for the market, but breeding hogs are much better running in a yard with a straw covered shelter and plenty of bedding for cold rough weather. Even then see that there is some ventilation to the shelter as pigs should not be in damp quarters. The straw above them in a shelter should be loose enough for the "steam" from the pigs on a cold day to penetrate it.

Farrowing pens may be very simply built colony houses, neither large nor elaborate, but the last word in cleanliness, and should be washed out with strong lye and be otherwise carefully disinfected before being used. These are days of fighting germs and worms and too much care cannot be taken to give the young pigs a clean start in life.

Hog Pastures If you are going to raise any considerable number of hogs you must have pasture for them. It is necessary both for economy in feeding and the health of the pigs. You should have an enclosure where your wintering pens are placed so the breeding pigs can run out and get some exercise, and pastures should open from this enclosure so the pigs could be shut off from the pasture, in the early Spring, until it gets a fair start.

Colony houses for brood sows should be built on skids so they can be moved. When the pasture is well up in the Spring, move these houses into it, and plow the enclosure, seeding it to a mixture of grain and rape for later pasture. In this way your enclosure is made clean and sweet by plowing and you get a variety of green feed for your hogs.

Kinds of Pasture Alfalfa makes a good hog pasture and a lasting one. The pigs should have rings put in their noses to keep them from rooting, and there is no better green feed for hogs than Alfalfa.

On the prairies where Alfalfa may be a bit difficult to grow, Fall Rye and Sweet Clover make a good mixture. Sow early in July and keep eaten down early in the Fall, then keep everything off it during the Winter and early Spring and both the



Market hogs on the Alberta Prairie

Rye and Sweet Clover will come on for a good early pasture the next year. If the hogs cannot keep it down, and you have a few sheep, turn them in.

A crop of peas and oats will also make a very good hog pasture and as they do not have to be cut with the binder you can seed heavier to peas than usual. On black prairie land one bushel of peas and two and a half of oats to the acre makes a good stand. Sow the oats first and then cross it with the seed drill to sow the peas so you will have an even distribution of your mixture. Either of these pastures will do well in Ontario also, where 3 pecks of peas and $1\frac{1}{2}$ bushels of oats would probably be enough to sow except on very heavy land.

Variety in Pasture Hogs want a change in feed as do most animals, and if you have an extra pasture outside of your enclosure you can change off. Rape gives variety in pasture for hogs but care needs to be taken about turning

them in or the results in sun scald, especially if there are heavy dews, will be rather discouraging. You must supplement your pasture with grain rations when your sows are suckling pigs, or when you are growing young hogs either for the finishing pens or for breeding purposes.

Weaning Time Great care must be taken to prevent young pigs losing ground at weaning time. They should be weaned when from six to eight weeks old and should be taught to eat before this time by being fed away from their mother. There is no feed like skim-milk, or butter-milk for weanling pigs. They should have some grain as well and a mixture of middlings, bran and chopped oats will keep them growing without a break. If the chopped oats has the hulls sifted out it will be a much superior feed for young pigs, as oat hulls are too coarse for these youngsters to digest, otherwise have the oats ground very fine, into powder if possible. If your skim-milk is scarce, a small quantity of oil meal will make a good substitute for it and is excellent feed for young pigs.

The young pigs should have plenty of exercise, and in Summer a green pasture to feed on. The latter will be not only the best but the most inexpensive way to feed them part of their rations.



Group of York gilts from one litter at the Manitoba Agricultural College

Finishing For Market The young pigs should be kept growing and after they reach the age of four months their grain ration should be increased in strength by the addition of barley until they are finished on a full feed of barley.

Rye is good feed for finishing hogs but should be mixed with oats or barley. It is a good plan to use self-feeders in finishing hogs as there is no animal that will display better judgment in taking the correct amount of feed for his necessary purposes than a hog. It is considered that feeding from self-feeders costs a trifle more per cwt. to make pork than feeding in a trough. In such tests, however, the trough feeding is done very carefully, and unless it is, the self-feeder is the best for finishing. When dry chop is fed from a self-feeder the hogs should have a liberal supply of good, clean drinking water. This is very necessary for all hogs, or in fact all livestock, as the supply of drinking water is often far too limited.

Mineral Hogs should have access to some mineral feed. This is particularly necessary in Winter time. A good mineral mixture to feed pigs may be made up of 80 lbs. soft coal, 15 lbs. salt, $3\frac{1}{2}$ lbs. lime and $1\frac{1}{2}$ lbs. sulphur. These quantities may vary a little according to the judgment of the feeder.

The University of Alberta got the best results from a mineral mixture of soft coal 76.5 lbs., slaked lime 2.5 lbs., salt 20 lbs., and sulphur 1 lb. In some cases slack coal alone is used with good effect, but the mixture is rather better.

Keep this mineral feed before your hogs in a separate feed hopper, and you will be surprised how much of it they will eat and how well they will thrive on it. In the Summer it is not so necessary as hogs have access to the soil and find there most of what they require. Do not by any means discount a hog's intelligence in seeking out what he needs if he has half a chance, or in keeping his sleeping quarters clean, if you will co-operate with him.

Breeding and Market Hogs When pigs are small there should be no difference in the methods of feeding, whether they were to be retained for breeding purposes or destined for the packing plant. They are being fed to grow them out or develop them at this time, and it is as important to keep young breeding pigs thrifty and promote their rapid growth as it is to keep market hogs adding to their size at that age.

When pigs get to be about four months old the market hogs

should be fed heavier with a view to finishing them a few months later and the breeding pigs should be kept on a lighter grain diet, with more green feed or roots. Breeding pigs need not be fed any barley at all, and sows should not be fed barley at any time, though the herd boar might get a small ration of barley in his feed at times.

Alfalfa or mangels are splendid feed for wintering pigs and should be fed liberally. The Alfalfa would be better ground into meal, but they will eat it if thrown to them from the hay mow. When potatoes are fed to hogs they should be cooked, as raw potatoes are not of much value as hog feed.

The hog is so much of a grain eater that if you do not provide some means of feeding him on green feed and roots part of the time you may have difficulty making much profit out of him. Breeding pigs should be fed outside as much as possible during the Winter. Keep the pigs going about, and if they are fed at some distance from their sleeping places they will take that much more exercise.

Self Feeder For Hogs We are indebted to the Dominion Experimental Farms for the following description, and drawing, of how to build a self-feeder for hogs.

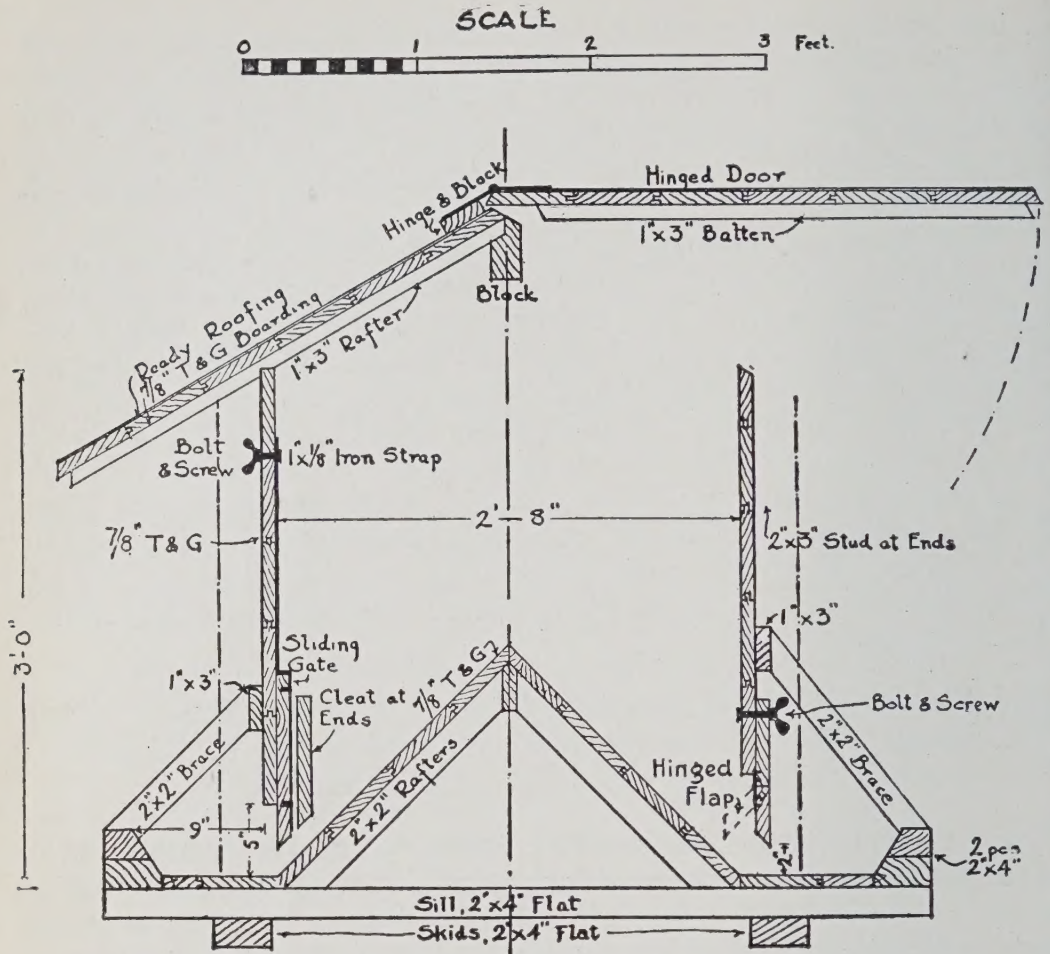
The Construction of a Self-Feeder *Base*—The feeder should rest upon two pieces 4 inches by 6 inches running lengthwise, placed flat. These may act as runners. On these, lay pieces of 2 inches by 4 inches to carry the structure.

Sides—Make the sides of 2 inches by 3 inches studding, sheathed inside by $\frac{7}{8}$ -inch dressed lumber, as shown.

Gate—Two arrangements of the feed-gate are shown. *This is the important part of the feeder.*

Note—To ensure the constant feeding of the meal, some means of agitation is necessary. Otherwise the contents will block close to the bottom.

Make the iron bands (two on each side) connecting the control slide at the bottom, with the thumbscrew at the top, of *light strap-iron* $\frac{1}{8}$ inch thick by 1 inch wide. When the meal



ceases to flow, the pigs naturally root or nose toward the source of supply, and being able to move this flexible slide, which in turn presses upon and breaks the meal blockade—they are rarely left with a “dead” self-feeder. To prevent the pigs forcing the board too far in it is, of course, necessary to place a cleat inside at either end of each slide. Allow about $\frac{1}{4}$ inch play between the slide and the cleat.

*Chapter XVI***SELECTION OF A SIRE**

THE most difficult thing a breeder of livestock has to do is to select a sire for his herd or flock. He has a group of livestock females on his farm and his only means of improvement is through the selection of a sire. If he is a cattle breeder he knows that the influence of this sire will be seen in every one of the calves dropped on his farm the following year. In breeding livestock you either go forward or back, there is scarcely such a thing as standing still. If you fail to select a sire that will improve your herd you will likely go the other way, and your profits with it.

The better your females the greater your difficulty will be, as men who have secured a herd of high class cattle find increasing difficulty in securing a herd header that will be reasonably sure of working further improvement. In fact, with choice pure-bred cows, the task of securing a good enough bull is one in which men more often fail than succeed. With somewhat ordinary cattle the case is different, however, and there are fairly well defined rules by which one may be guided.

Use Pure Bred Sires We are using cattle as an example, but what is true in their case is true in all lines of livestock.

In the first place you should secure a sire that is **pure bred**, the advantage being that his lines of breeding will be known and are likely to be reasonably good. You might find a grade animal of good individual merit; he might even look better than the pure bred, but you know nothing of his ancestry and he might be descended, a cross or two away, from a very bad scrub and he might "breed back," and give you a group of undesirables. In the pedigree of the pure bred sire you have his ancestors identified and it will not be difficult to look them up and see what they are, or how they were bred. The pure-bred will be stronger in his blood lines than the grade, having been bred for generations from pure-breds of that breed. As a result he will be a more impressive and prepotent sire and likely to work a greater improvement in your herd.

Avoid Outstanding Weaknesses Do not select a sire with an outstanding fault, though he otherwise is a very good individual. You will be safer with a beast not quite so good in these other particulars, but that doesn't fall down very badly in any one qualification. Like doesn't always beget like, but when its a fault you may be more nearly certain of the results. A bull that has an outstanding weakness, or fault, is almost certain to pass it on to his calves. We have seen bulls breed a fault, like a high tail head, into herds and the only way to get rid of it seemed to be to sell all the females by him.

Masculinity With Quality A sire to be prepotent must have strong masculinity. He must have that vigor and aggressiveness in appearance that makes him look like a "male" of his species. He must also have breed character; that is, he must have in a marked degree the desirable characteristics of the breed he belongs to. One condition that may apply to all breeds, and all kinds of livestock, is that a good sire must have what stock men call "quality." There must be an absence of coarseness and harshness in the hair and skin. One hundred and fifty years ago a famous old North of England cattle man was noticed at the Fairs to be feeling the hides and hair of cattle and talking about their "touch." If they were harsh or coarse he wanted none of them. Investigations since that time have shown that "quality" is reflected in the hair and hide, and good thrivers that are easily fed, and high class dairy cattle, always show quality in skin and hair. Without "quality" in your sire the chances for improvement in your herd are not good.

Avoid Overgrown Sires Sires of a medium size for their breed have been found to be the best. Large, overgrown brutes have never proved to be good sires. Being "up to a fair size" is all you should look for in a sire as you cannot add bulk to your animals by using oversized sires without sacrificing too much in other ways. They are apt to breed a sort of monstrosity in some particular or other.

These are days of early maturity and compactness in animals, as that has been found to be the most profitable and useful animal to produce. The demand for small carcasses in beef,

lambs, and bacon hogs, under a certain weight, has changed our plans of breeding, but in any event you never improve your livestock by using a sire that is much larger than the average. This is quite true in breeding all kinds of farm animals.

Constitution Essential Constitution is one of the essentials in all livestock. If an animal has not got plenty of room for its heart and lungs it will not be a good thriver, nor, if it is a dairy cow, can it stand up under the strain of heavy milk production. Avoid, therefore, an animal that is slack or "tied in" behind the fore legs. A beast must be thick there to give it a good constitution, and you have only to observe steers in a feed lot or cows in a dairy to find how true this is. Lack of constitution, or slackness around the girth, in a sire will be injurious to your herd, because this is a fault that seems to be capable of transmission to his offspring in far too large a percentage of cases. In a country with Canada's climate, a vigorous constitution is very desirable, and the conditions for developing one are also ideal. You must have the natural condition first, though, and by the selection of sires with good heart girth, giving plenty of room for heart and lungs, you can soon build up a herd of strong, vigorous animals.

Importance Of The Sire Taking your cattle as an example, bear in mind that while each cow is the mother of only one calf in a year, the bull is the sire of all your calves, hence, your improvement relates mostly to your herd header.

Always keep in mind the fact that to produce calves better than their mothers you must have a bull strong enough in his blood lines, and perfect enough in his conformation, to make sufficient impression on your cows to work improvement in the offspring. This improvement will only be secured if the bull has "character," and good breed type, and has strength and masculinity without being coarse. It is the vigorous sire with quality, smoothness and character that leaves his impression on the herd.

Retain a Good Sire When you have secured a good breeding sire, one that is a real improver, don't sell him on any account. Keep him and use him while he lives. It will pay to

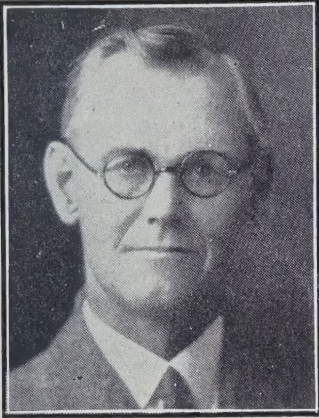
buy good unrelated females to breed to him and get a younger sire to breed to his daughters. Really good sires are rare. Breeding livestock is not an exact science, and every once in a while a sire is found that proves an outstanding breeder. He may be better than there seems any reason for, in which case don't part with him except for a long price. His value to you, of course, will depend on your class of females. If you are going to raise top progeny, they must have good mothers as well, but when you have found a good breeding sire in any line of livestock you have found a valuable treasure and one you should not easily part with.

The selection of a sire to mate with a good group of breeding females is one of the most difficult, withal one of the most interesting tasks a farmer has to undertake. The value of experience in making such a selection is difficult to estimate. Some livestock men have rare judgment in such a venture and some are said to have rare luck. There are, however, well defined breed characteristics that men of experience are guided by in making such a selection; we have, therefore, asked several well-known men, who have been successful breeders, and are recognized judges of their favorite breeds of livestock, to give the readers of this publication the benefit of their opinions.

It would have been easy to select a number of men to represent each breed, but space would not permit. We have, however, been fortunate in securing brief, well-expressed and quite comprehensive descriptions of what constitutes a good sire, from men well qualified to express opinions upon this all-important question.

A Draught Stallion Mr. W. L. Carlyle, Manager of the E. P. Ranch, in Alberta, for His Royal Highness the Prince of Wales, a judge of wide experience at the large shows, a breeder of draught horses on a large scale and a former Dean of Agriculture in the Universities of Colorado, Idaho and Oklahoma, in reply to the question: "What would I look for in a Draught Stallion?" says:

"In the selection of a sire of draft horses it is of prime importance to consider, first the kind of mares with which the stallion is to be mated. If present standards are to be maintained or any improvement effected it must come about by so mating the



W. L. CARLYLE

present stock of draft mares with stallions that they will strengthen their weaknesses and perfect their imperfections. What might be a very useful stallion on one type of mares would be very unsuitable on another type.

“Individually, the draft sire should have size, substance and massiveness, and must be symmetrical and well balanced in conformation. A deep, thick, moderately compact body made up of a bony framework of the best quality, covered and bound together with such muscles, tendons and liga-

ments as will insure great strength, easy graceful movement and great durability, are essential characteristics of good stallions of all draft breeds. This body should be carried upon moderately short, straight and strong legs well set under the body. The bones and tendons should be clearly defined and the joints especially clean cut and wide in conformation, as it is upon these that the stress and strain of heavy draft service must be borne.

“The quality and conformation of the feet of a draft sire are of greatest importance since they must bear the weight of the animal in addition to the force exerted by draft animals in pulling heavy loads over hard and very often rough, uneven surfaces. The hoof must be of good size, full and well rounded in shape, with deep, thick walls and wide heels, and should be united to the leg with fairly short and sloping pasterns to give springiness of movement and a minimum of jar and concussion when the feet come in contact with the ground. The action should be straight, balanced and trappy with a marked freedom of motion at the stifle, hock and pastern joints.

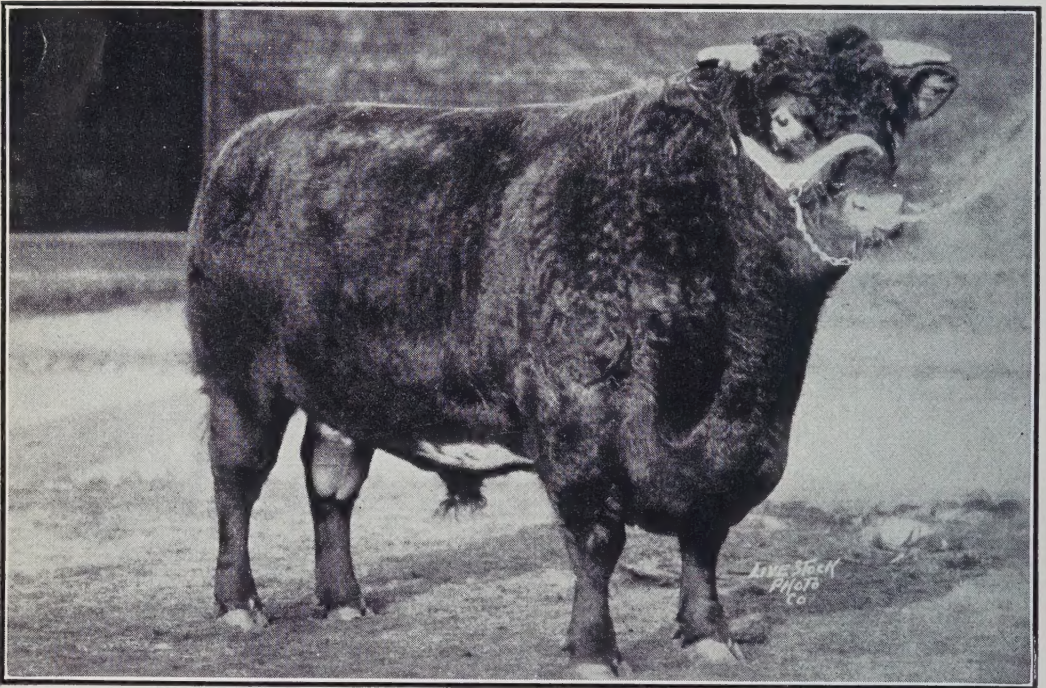
“Finally a good draft sire must have a good disposition and show every indication of intelligence and docility as these qualities have a very great bearing on the usefulness of the draft horse in service.”

Shorthorn Bull Mr. W. A. Dryden, Maple Shade Farm, Brooklin, Ontario, an outstanding breeder, judge, and importer of Shorthorn cattle, Chairman of the Executive Committee of the National Livestock Records for Canada and a past President of the Dominion Shorthorn Breeders' Association, in reply to the question as to what he would look for in a Shorthorn Bull says:

"A Shorthorn Bull should, at first sight, present an appearance of 'general goodness,' an appearance of symmetry, smoothness, style and quality, with no outstanding weakness. "His head should be strong and masculine, but not rough



W. A. DRYDEN



Thornham Minstrel, grand champion Shorthorn bull at 1927 Royal Winter Fair. Owned by Duncan Campbell, Moffatt, Ont.

and coarse. It should display the fact that it is a bull you are looking at, not a steer or a female. The face should be proportionately short and wide with a bold, fearless eye. The head should be coupled to a short, stout neck, so set as to have a carriage and style which is at once attractive. The neck should have a smooth blending into the shoulders, which must not be prominent or bulging, yet wide and supported underneath by legs well set apart. From here backward the body should be, more or less, like a box, straight on top and underlines, well spread out all the way through, with a rotundity in general, which leaves the impression of greatest bulk and weight in a given space.

“He should have a wide, well arched rib, of great depth. The fore flank and rear flank should be deep and full, conforming to top and bottom lines. He must stand square on his four legs. The rear legs should not be unduly crooked, but should be fairly straight in a standing position, showing the bend when on the walk. Look at the bone below the knee; we like strength as denoted in the size and thickness of the bone. The light-boned variety is not in much favor with breeders as an ‘improving’ sire.

“Soft, silky hair and a mellow, pliable skin denote feeding qualities which are not usually found in an animal with coarse, wiry hair and a harsh skin. Underneath there should be found great thickness of flesh, not fat in undue proportions, and these two are quite distinguishable.”

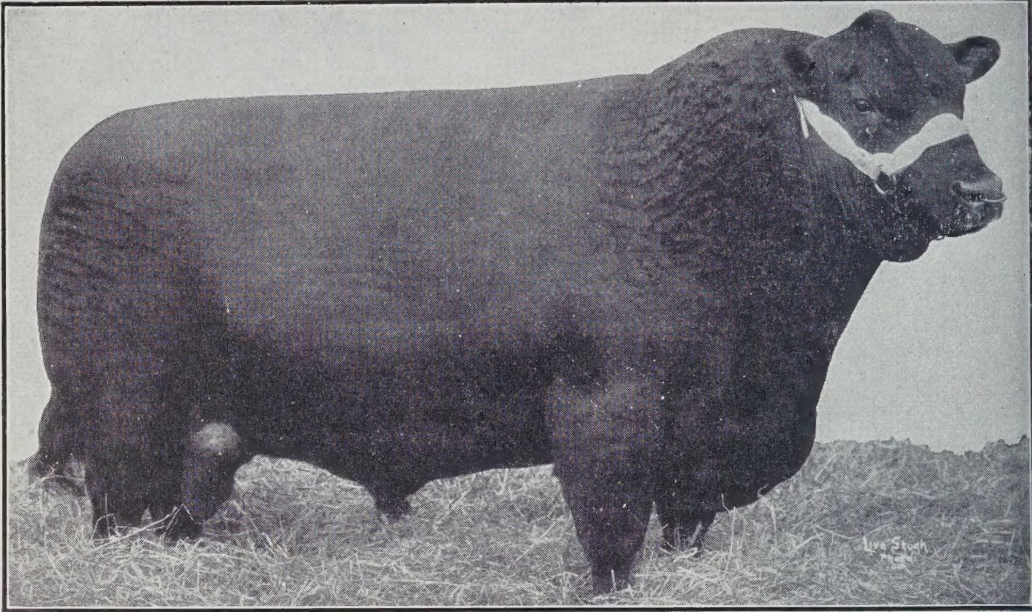


HON. J. D. MCGREGOR

Aberdeen Angus Bull His Honour, J. D. McGregor, Lieutenant Governor of

Manitoba, who has had a half century of experience in Western Canada as a pioneer live stock man, an irrigation and dry farmer and one of the country's largest breeders of pure bred cattle, consented to write a brief description of an Aberdeen Angus Sire. Mr. McGregor

has been an extensive and progressive Western farmer. He has tackled large undertakings and his achievements in tilling soil



Blackcap Revolution grand champion at Chicago International 1923 for Jas. D. McGregor, Brandon, Man. Also a sire of grand champions

and breeding high class live stock are well known in more than one country.

When Mr. McGregor became an Angus fancier it meant much to this breed of beef cattle to have his energy and enterprise behind them. Two characteristics of Mr. McGregor's life have been courage and kindliness, and he carries lightly the honors that have now so fittingly found him.

In reply to the query of what he would demand in an Aberdeen Angus Sire, Mr. McGregor says:

"A good type of Aberdeen Angus bull should be deep bodied, straight in his lines and smooth in his covering. All his corners should be well rounded and he should be set on short legs. I like a medium sized bull weighing, at maturity, when fitted, from 1,900 to 2,200 pounds. I would insist on him being smooth, uniformly good all over and close to the ground.

"He should be markedly masculine in his character, with a good clean cut head, wide face, good muzzle, a well-defined throat and a good crest. His shoulders should be smooth but

with plenty of width on top and his neck vein compactly blended into his shoulder.

“He should have a deep, full fore-rib, a thick, wide, meaty loin, hook bones laid in smoothly and covered with meat, rump square, with width at the pin bones, and his quarters should be deep and well rounded. His top line and underline should both be straight and his flanks full.

“An Angus bull should have a good coat of fine, soft hair and a pliable hide. He should have a medium weight of bone not too fine and not objectionably coarse.

“In other words, an Aberdeen Angus bull should be as low set, as thick and wide and as full of quality as you can get him. His legs should be set under him squarely and solid, and he should walk with boldness and carry himself well pulled up together.”

Hereford Herd Header Mr. W. W. Boyd, of Bobcaygeon, Ontario, President of the Canadian Hereford Breeders' Association, is a son of the late Mossom Boyd,



Campelion 7th. Senior and grand champion Hereford bull Canadian National Exhibition 1928. Mossom Boyd Co., owners

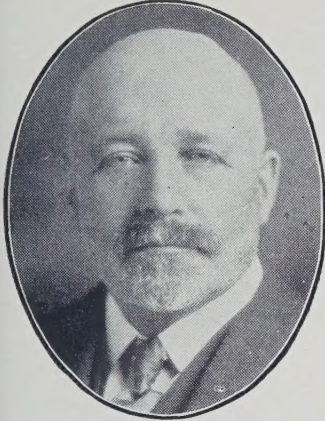
who did so much for the Hereford breed in Eastern Canada, as a progressive breeder and exhibitor of white faces, and virtually produced the Canadian branch of Polled Herefords. W. W. Boyd is a constant exhibitor of good Herefords and is an excellent judge of beef cattle. In reply to our request for a few paragraphs about a Hereford herd header, Mr. Boyd says:

"The controlled breeding program of a Hereford herd has, or should have, only one objective. That is the production of superior beef type animals. In this program the Herd sire has primary place since his influence for progression or retrogression enters into every mating that is made. The conformation and appearance of an excellent Hereford sire is easily described and if 'like' invariably produced like, selective breeding of cattle would be a very simple matter. That is not the case, however, and breeding must be conducted by what mathematicians call 'Trial and Error.' Experience teaches that there are certain qualities to be looked for in a Hereford Sire that will ensure a great probability of success. First look for fleshing qualities. Choose a meaty, deep-fleshed bull, of the easy keeping kind. The head most often associated with this kind is one with a short face and broad muzzle, wide between the eyes which should be rather protuberant and full of life. Second, look for conformation. Look for a good heart girth, well sprung ribs, broad buttocks and well let down in the twist, short legs, good straight top and bottom lines. Choose a bull with enough bone but do not demand excessive bone development. As far as color and markings are concerned do not be the victim of fickle fashion. If the bull is good, any shade of red with a white face will be an honourable coat.

"Finally and not least. Look for a tried sire whose progeny you can see. Don't let a bull go to the butcher at 5 or 6 years. A Hereford at that age is still a young fellow. More real breeding progress has been made by retaining prepotent sires to the limit of their usefulness than by a continuous and unreasoning discarding of herd sires."

**Holstein-Friesian
Bull**

Mr. R.M. Holtby, of Port Perry, Fieldman, in Ontario, for the Holstein-Friesian Association of Canada, an excellent judge and a progressive breeder of Holsteins, in reply to the query as to



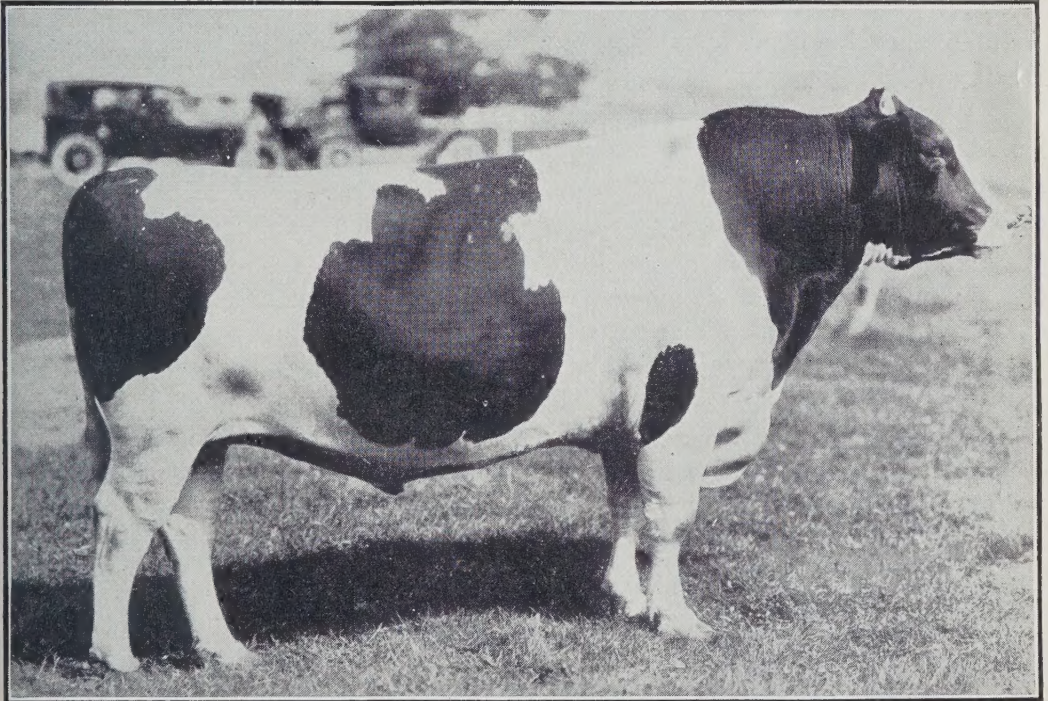
ROBT. M. HOLTBY

what he would look for in a Holstein-Friesian Bull, says:

"I would look for a bull out of a Record of Performance dam whose milk tested at least 3.5% butter fat and giving, if mature, fifteen thousand pounds, or more, of milk.

"His head should tend to quality rather than coarseness, with a wide muzzle, prominent eye, small to medium horn, throat clean cut, with a long enough neck that, when he stands at attention, one half or more of his head is above his top line.

"I would insist on a straight top line, especially carrying out straight at the rump, wide at the pin bones, thurls carried well



Johanna Rag Apple Pabst. The greatest winner of grand championships among the Holstein bulls of this continent. Owned by T. B. Macaulay, Mount Victoria Farms, Hudson Heights, Quebec.

up so that looking from behind, his rump has a flat appearance.

"I would require him to be low-set, not too long in the legs, but with plenty of depth of rib, a good full heart girth, and size enough to weigh 2,200 lbs., or more, at maturity. He must have well sprung, open ribs with a mellow skin, and should be thick enough to give him balanced proportions."

Ayrshire Bull Mr. R. R. Ness, of Howick, Quebec, breeder, exhibitor and importer of Ayrshires for many years, in answer to the question, "What do you want in an Ayrshire Bull?" says:

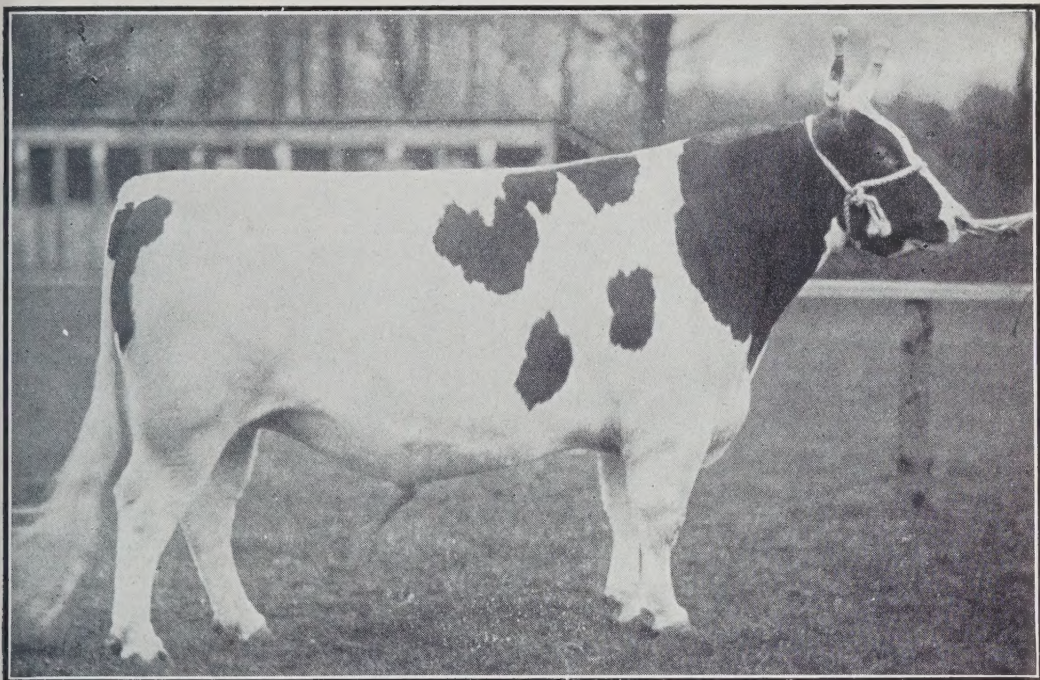
"I want a strong, masculine head coupled with a long, clean-cut neck and as little crest as possible; a smooth sharp shoulder with plenty of strength behind the shoulder and an absence of any beefiness about the brisket. I want a deep capacious dairy middle with the depth carried well back to the flank. I like a well sprung and a good open rib; but I would rather have a deep flat open rib, than a tight, well sprung, short rib. A loose mellow hide is always an indication of dairy quality as is also clean, flat bones. I like a good strong hind-quarter. I want it long and wide with the width well carried down. I do not want a short, round, beefy hindquarter, as a bull of that sort is very likely to sire heifers with badly balanced udders.



R. R. NESS

I like a big, deep, open bull, but with that size I want dairy quality, and in no case would I sacrifice dairy quality for size. As stated, I want length in the neck and length in the hind-quarter, but I do not want length in the middle. A long middled bull will always breed weak backs and weak heart-girths. I want good, broad strong loins, coupling smoothly, good level rump, fair width at the pin bones and a straight level tail head.

"I want Ayrshire character and breed type which means attractiveness, alertness, full bright eyes, large, clean nostrils and straight smooth lines."



Dunlop Radiance. Grand champion Ayrshire bull at 1928 Royal Winter Fair, Toronto. Owned by W. W. Skinner, Semieville, Quebec. This bull was a champion in Scotland before he was imported.

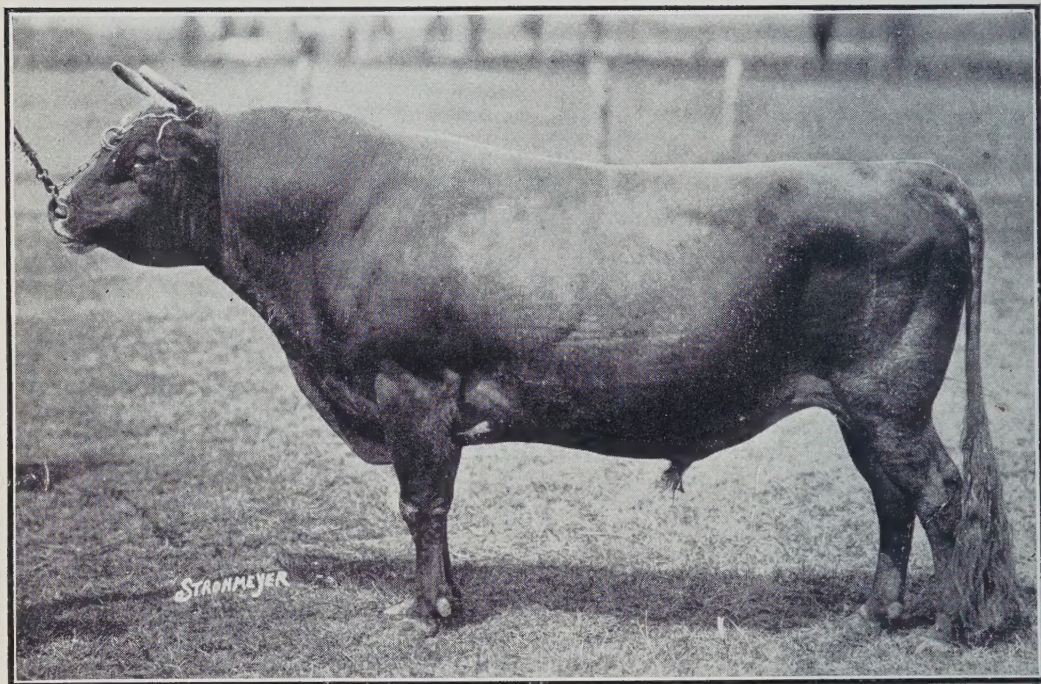
Jersey Sire Col. Bartley Bull, Honorary President of the Canadian Jersey Cattle Club, of the firm of B. H. Bull & Son, Brampton, Ontario, the largest breeders, importers and exhibitors of Jerseys on the Continent of America, in reply to the question, "What do you look for in a Jersey Sire?" says:

"So far as my memory goes, I have never known a man who could look at a Jersey bull and tell whether he was a good sire or not. One can tell much, however, by a study of the pedigree, providing he has a sufficient knowledge



COL. BARTLEY BULL. B.A.

of the females as cows and of what kind of daughters the bulls produced. I feel that in selecting a sire, one must know these particulars for five or six generations, but in knowing all this, the bull, which would be a great sire in one herd would be of no benefit, or perhaps harmful, in another.



*Jersey Volunteer, the outstanding breeding Jersey Bull of Canada,
Owned by B. H. Bull & Son, Brampton, Ont.*

“I would much sooner have a bull from a family of five or six generations of cows that were of proper type, paying most careful attention to shape, attachment and smoothness of udders (not quartered or divided) and teats of proper size, placing and not ‘strutting’; cows that I knew to be good and useful producers, than from a cow with an immense record.

“Has the sire’s or the dam’s side the greatest influence on the progeny of a bull? I do not know, but I have never known a great bull where both were not right and where there was not a proper blending of blood lines.

“When a customer seeks a herd sire from me I try first to

find out what his foundation cows were and the breeding of the bulls he has used. Then from there I am supposed to know what will be the weak and strong points in his herd and select a bull for correction and improvement."

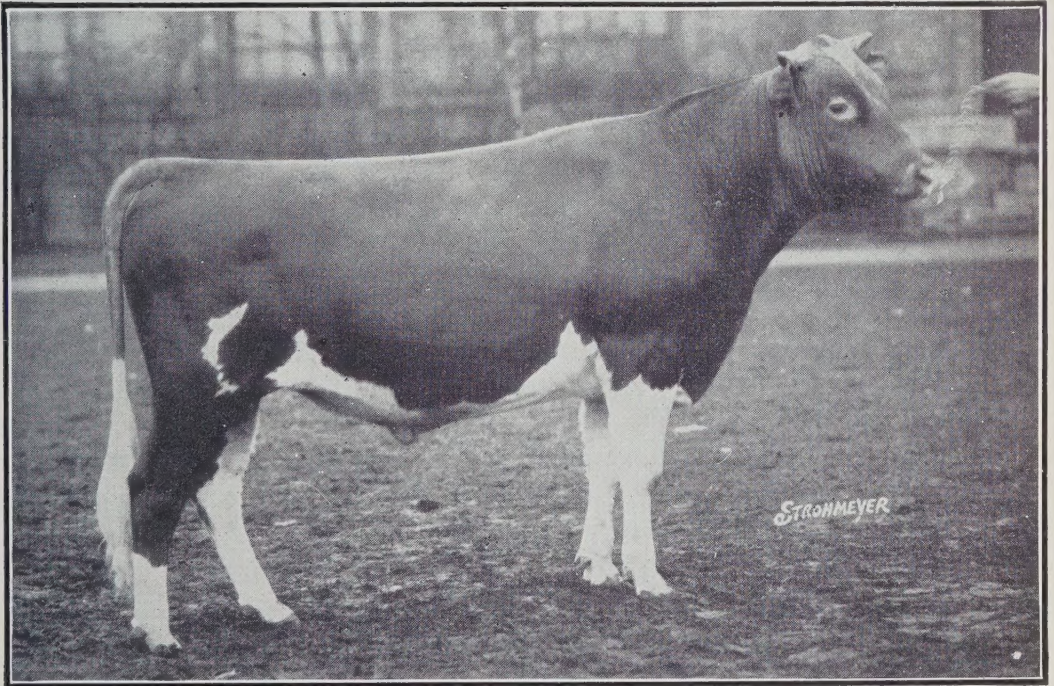
Guernsey Sire Dr. R. M. Jenkins, Superintendent of Don Alda Farms, at Todmorden, Ontario, who has built up the great herd of Guernseys on this farm, in reply to the question, "How would you select a Guernsey sire?" writes:

"Among the many difficult questions which present themselves to the breeder of dairy cattle, none is more important than the selection of a bull to head the Herd.

"It is easy to get an average bull,



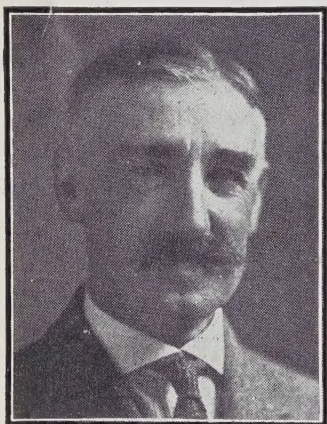
DR. R. M. JENKINS



Don Alda Mixer Radiant, 1st prize Jr. yearling Guernsey bull 1928 Royal Winter Fair for Don Alda Farms.

and for those who desire nothing more, there is no problem at all. On the other hand, for those whose ambition is to produce stock that is above the average, an effective method of judging the breeding value of a bull is essential. The high road to successful breeding lies in the use of an outstanding sire, hence it is imperative for the progressive breeder to ascertain as much as possible about the merits of the bull's female ancestry, taking into consideration the type and individuality of his dam and grand dam and also if possible his sisters, together with as many of their Advanced Registry records as are obtainable.

"The future herd sire should be sired by a bull with a reputation, such sires being prepotent, will transmit their individuality and the merits of their ancestors, to their offspring in such a marked degree that their calves will invariably prove superior to their dams, for the actual breeding worth of a bull is disclosed in the qualities transmitted to his offspring."



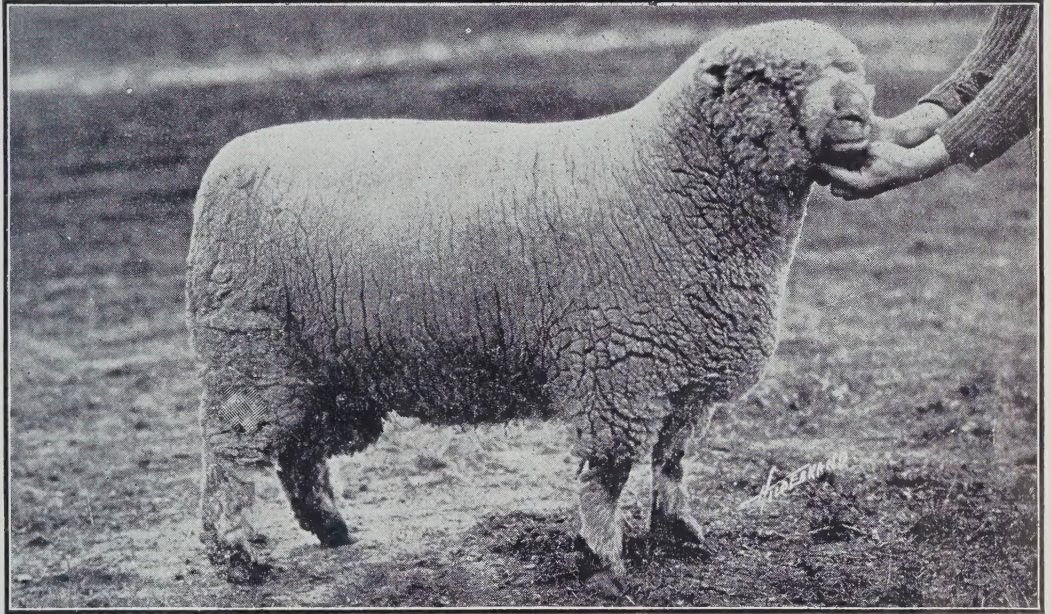
COL. ROBT. McEWEN

A Ram Colonel Robert McEwen, of London, Ontario three times winner of the Grand Championship, at the Chicago International Show, for car load of fat lambs, in reply to the query, "What do you look for in a breeding ram?" says:

"The sire, whether it be in the stud, herd or flock determines, yes dominates, the breeder's successful operations in whatever sphere he engages. This being the case it is most important to know the essentials that are required.

"In sheep breeding, either pure bred or grade, the ram must be strongly masculine in appearance, bright and alert in his expression and movement, of medium size. Avoid the individual weak and weedy as well as one that goes to the other extreme of being too coarse and deficient in quality. In conformation he should have a strong muzzle, head broad between the eyes, neck short and muscular, top and bottom lines of body straight and ribs well sprung and deep. He must stand firmly on good straight

legs that are well muscled and have no defects in feet and pasterns. Very important is the right kind of fleece with a close crimp or lock without any fluffiness, and no dark fibres."



A typical Shropshire ram

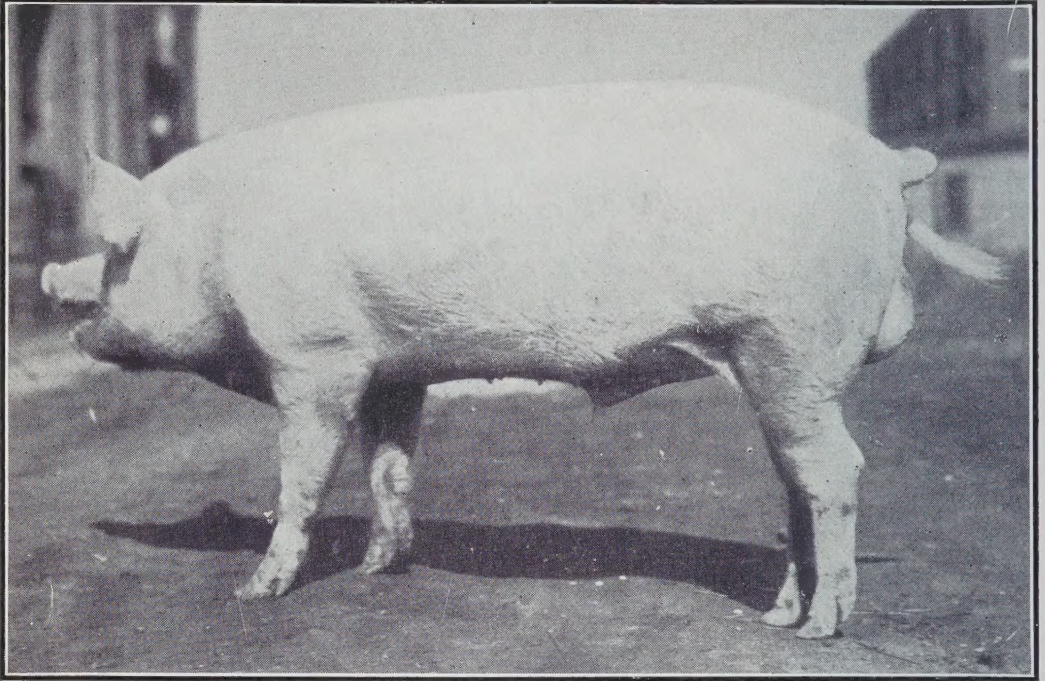
Bacon Type Boar Mr. George B. Rothwell, Dominion Animal Husbandman, in connection with the Experimental Farms, in reply to the question as to what he would require in a sire for breeding bacon hogs, says:

"First—I want a **BOAR**. The first and last impression must be to that effect. Active, vigorous, masculine, inquisitive, if you like, and all of these characteristics he may have without being a cannibal and a man eater.

"Second—Breed character he must have. His head will tell me a lot about that, and is by no



GEO. B. ROTHWELL, B.S.A.



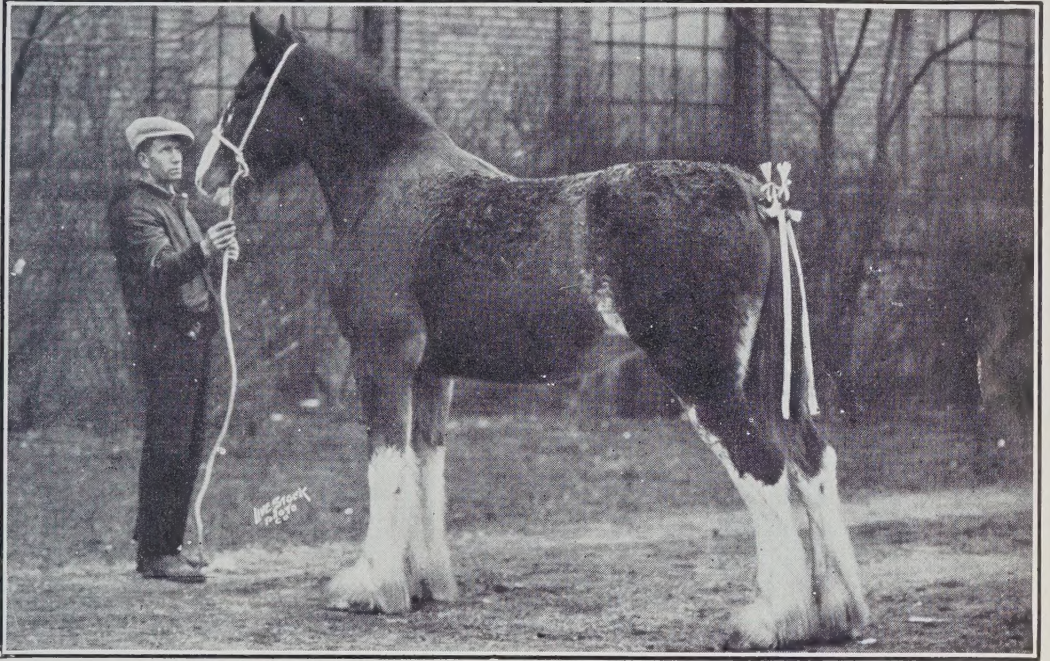
C.N.E. and Royal Show grand champion Yorkshire boar bred and owned by J. E. Brethour and nephews, at Burford, Ont.

means the least important part of a hog, even if it doesn't make bacon. A medium nose, good breadth and development of poll, a fairly large ear, well set and with no tendency to sloppiness—and intelligence, you can't describe, but you can always recognize.

“Third—Length, of course, but length with strength. If length is extremely needed in the herd, I would prefer featuring it in the boar rather than in the sows.

“Fourth—Strength with quality, no weakness in fore flank, with the flank blending smoothly into a clean, strong shoulder (a really masculine boar will often look a bit strong in shoulder when he is developed); a strong top line with a nice, even arch, and a straight underline, well carried through fore and aft. As to spring of rib, no steep pitch to the top rafter, but well carried out, and cropping to a straight, flat side. As to depth, it must be proportionate to length. Plenty of bone of the good clean kind, no undue coarseness or thick joints; and no tendency to weak pasterns.

“Finally—I’d try to consider him as I would if I were buying a dairy bull—see his sire and get ideas as to whether he bred right, in this case, whether he bred plenty of selects; and then his dam—her type, breed qualities, etc., the size of her litters, and the litter out of which the boar came in particular.”

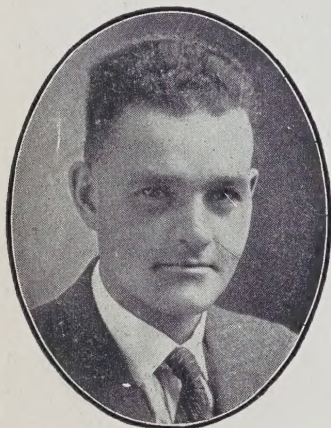


Donne Lodge Princess, grand champion Clydesdale female, Toronto Royal Show 1927, owned by Mrs. W. H. Bryce, Arcola, Sask.

Chapter XVII

TRACTOR AND COMBINE

TRACTORS are coming into very general use on many farms that are large enough to make the purchase of them profitable. Mr. J. G. Taggart, Superintendent of the Dominion Experimental Farm, at Swift Current, and formerly Principal of the School of Agriculture at Vermilion, Alberta, has had a good deal of experience in the operation of tractors and has made a careful study of their value and uses on farms. Mr. Taggart kindly consented to prepare an article, embodying his experience with the tractor, for this publication, as follows:



J. D. TAGGART

“Before discussing the uses to which the tractor may be put on a farm, it would seem advisable to examine a few of the factors which should be considered prior to making the purchase of a tractor. In making such an examination it is not intended to enter into the horse versus tractor controversy, but rather to consider the history of the development and use of farm tractors, in order to arrive at reasonably sound conclusions as to their economic uses under present day conditions.

The development of the tractor using the internal combustion engine as a source of power, began early in the present century. During the first dozen years, the tractor consisted essentially of a heavy duty, one or two cylinder, gas engine, mounted on an excessively heavy frame and wheels, with open gear, or gear and chain, transmission.

“This type of tractor developing as it did a large amount of power, was very useful for belt work, but its drawbar use was limited to such work as prairie breaking where the traction was good and the fields were large. The great objections to this tractor were, excessive and costly repairs, slow movement and a limited range of usefulness.

“The second phase of tractor development saw the production

in large numbers of a light tractor, developing eight to twelve horse power on the drawbar. In general this type was much more efficient mechanically, more easily handled, required less costly repairs and had a wider range of usefulness than its predecessor.

"The chief objection to its use lay in the fact it did not give the operator command of sufficient power to permit of any real saving in labour. The necessity of saving labour as well as the curtailment of all expenditures was strongly evident during the post war period of depression. This period coincided with the decline in popularity of the small tractor.

"The third phase of tractor development was based on experience gained in the two preceding periods. It was now recognized that the tractor to make a wide and successful appeal to farmers must have reasonably light weight and high mechanical efficiency combined with sufficient power to do the work ordinarily accomplished by from eight to sixteen horses.

"During the past seven years manufacturers have succeeded in producing tractors which have been sufficiently close to this standard to induce increasing numbers of farmers to purchase and use them. Since 1925, good crops and fair prices have also greatly stimulated tractor sales along with sales of farm equipment generally.

Evolution Follows Two Distinct Lines "At the present time it is evident that the evolution of the farm tractor is following two distinct lines. For the larger farms on which the arable land is devoted chiefly to grain crops the tendency is for the moderate sized tractor to increase in power, without any sacrifice of mobility, mechanical efficiency, or durability generally associated with the smaller tractor. Along with this tendency toward greater power many mechanical refinements and improvements are being made. This is particularly true with respect to lubrication and bearings. Increased ground speed is also important.

"The other line of evolution is the development of a very light tractor of moderate power, which with very little sacrifice of general utility, is also adapted to the work of cultivating row crops, operating power mowers and binders and other light work for which the larger tractor cannot be used economically.

**Choose the Type
Suited to Your Purpose**

“With the two types of tractors from which to choose, the farmer must consider the nature and amount of work he would have for a tractor to do and then decide which is best suited to his purpose.

“On the larger farms on the prairies the tractor which develops from fifteen to twenty-five drawbar horsepower is undoubtedly in greater demand than the smaller machine. There are sound reasons for this preference.

“While the exclusive tractor farms are increasing in number there are still relatively few. This means that while there are over fifty thousand tractors in use in the three Prairie Provinces, most of them are used in conjunction with horses.

“The tractor is used for two main purposes. The first is to speed up the work of preparing the land for Spring seeding, and the second is to correspondingly increase the speed of harvesting and threshing operations by pulling power binders or combines and by providing belt power for threshing.



Farming by gasoline power in Western Canada

Speeding up Work "As to the use of the tractor in speeding up Spring work, it may occur to some to Is Essential question the idea that speed is more

necessary now than it was before tractors were invented. In reply to this question it is only necessary to point out that while the number of occupied farms in the Prairie provinces is increasing very slowly, the cultivated land is increasing at the rate of about one million acres per year and that in Saskatchewan between 1911 and 1926 the cultivated area per farm increased from 124 to 237 acres.

"This increased acreage is being handled without anything like a corresponding increase in personnel. Each man engaged in Agriculture is handling a much larger acreage than was the case a very few years ago. The greatly increased acreage per individual worker makes speed in the performance of both seeding and harvesting operations most essential, hence the greater use of tractors and the adoption of larger and more efficient horse-drawn implements. From some points of view this tendency toward larger farms may be deplored, but that it is a fact cannot be questioned, neither can it be questioned that farmers generally regard it as advantageous to themselves, otherwise they would not be displaying such unanimity in increasing the size of their holdings.

"A study of the relation of the tractor to the evolution of farm practice clearly indicates that the reason for the fairly extensive use of a tractor is that each man can handle a larger acreage, rather than effecting any great saving in the cost per acre of specific operations. It is obvious that if a man can seed and harvest four hundred acres instead of three hundred in the available season for such work, then he will gain by the amount of the net return from the additional one hundred acres.

"On this ground alone the use of tractors is bound to expand in Western Canada. At the same time it must be recognized that there are still many farms which are too small or where other conditions are too unfavourable to permit of the economic use of tractors. On other farms where tractors are being used there are still many jobs which can be done with greater economy and general advantage by horses. Then there is a moderate but

increasing number of farms from which the horse may be dropped entirely or placed in a very minor position.

The Tractor In Ontario "How does the tractor fit into farm work under such conditions as prevail in Ontario? We find that here, too, tractors are being used in considerable numbers, but for somewhat different reasons than on the prairies. Under Ontario conditions the arable land on each farm is already nearly all under cultivation, hence expansion of cultivation within existing farm boundaries is limited. Likewise expansion by purchase is more difficult than in the newer Western communities. These facts might seem to preclude the successful introduction of the tractor.

"However, it has been found possible to gain some of the advantage of increased labour efficiency associated with tractor operation by dispensing with some of the hired labour formerly used. Another factor of very great importance is that with the prevalent type of equipment and size of horse outfit such operations as ploughing and discing are about twice as costly in Ontario as the same operations in Saskatchewan.

"This means that with tractors and horses on an approximate parity with respect to cost per acre of doing work in Saskatchewan the tractor has a marked advantage in the matter of cost per acre in Ontario.

"Not only is the standard type of farm tractor finding a wide use on Ontario farms but the so-called "farmall" or "do-all" type is also being used to a very considerable extent where row cultivation and other special jobs are of major importance. The extreme adaptability of this type of tractor opens for it a wide field of usefulness on farms upon which the standard type of tractor could not be used economically.

"Assuming that such conditions as size of farm, topography, soil type and other factors which determine in a general way whether the purchase of a tractor is sound economy, are favourable to tractor operation, then it is undoubtedly true that the success which a farmer may hope to achieve with a tractor will depend largely upon his own acts or omissions in the care of his machine.

"A few points of first importance might be stressed:

Breaking in the Motor "When the tractor or any internal combustion motor is new, it should not be operated at high speed or under a full load. Closely fitted bearings may be damaged, if not burnt out, or cylinder walls may be scored within a few hours of starting the motor. If such damage occurs, while the tractor may continue to run and pull a load, it will never give the service that it would otherwise have given.

Lubrication "Of all matters connected with tractor operation, lubrication is the most important. If the right grade of oil is not used, if precautions are not taken to prevent condensed fuel diluting the oil, if oil is not changed at proper intervals, the efficiency of the tractor may be greatly impaired or the motor may be entirely ruined. If too heavy an oil is used in a new motor or during cold weather, it may be impossible for the pump to force the necessary amount of oil to the bearings. If too light a grade is used, especially in an old motor or in hot weather, a film of oil may not be maintained on bearing surfaces with consequent serious damage to bearings.

"No single grade of oil can be specified for all tractors nor for any one tractor under all conditions of work and weather. Expert advice on this matter can be obtained either from the maker of the tractor or from the oil company from which lubricants are purchased. Both are obviously interested in having the farmer's tractor give him the best possible service, and both are capable of giving sound advice on tractor lubrication for any set of conditions.

Crank Case Dilution "Excepting under ideal conditions, some unburned fuel is almost certain to pass the piston rings and gradually impair the lubricating quality of the oil by dilution. This difficulty can be largely eliminated by care in setting the carburetor so as to have as lean a mixture as is consistent with efficient operation, by avoiding the excessive use of the choke, by partly or wholly covering the radiator when the temperature is low and, where kerosene is used, by thoroughly warming up the motor on gasoline before changing to the heavier fuel. Some of the operators seem to think that as soon as the motor will run on kerosene the switch from gasoline may be safely made. This is entirely wrong. Because of the lower

volatility of kerosene the motor must be operated under a higher temperature than with gasoline, in order that the fuel may be vaporized and crank case dilution with its attendant evils eliminated. Even with the greatest of care when a tractor is being run on kerosene, more attention must be paid to the grade and quality of oil used and oil must be changed more frequently.

"It has been impossible in the space allotted for this article to discuss the specific jobs for which tractors are adapted, but instead, consideration has been given to some general principles involved in the use of farm tractors. The matter under consideration is summarized in the following sentences:

(1) Tractors as now built are mechanically sound and efficient. With proper care they will give good service.

(2) Where large areas of land are available for cultivation, the greatest advantage of the tractor lies in the fact that its use permits each man to handle more acres.

(3) On many small farms the outlay for tractors would be greater than returns would warrant.

(4) Where intensive and costly tillage operations are now performed with small horse outfits the tractor will effect distinct savings in cost per acre.

(5) For smaller farms producing a great variety of crops, tractors of the farmall type are preferable.

(6) On farms which have belt work requiring from 20 to 40 horse power a tractor is usually the most satisfactory source of such power. On such farms it is profitable to use the same tractor for land work during the peak load season at least.

(7) Finally, it must be recognized that tractors are constantly undergoing mechanical improvement, so that to make full and proper use of this source of power, a farmer must keep himself informed as to new developments."

Harvesting with Combine

WHILE harvesting with a combine is not a new thing in some countries, it was only in the year 1928 that these machines were used to any great extent on the Canadian prairies. Crops usually cut by combines were light and grown in semi-arid districts. To make a machine that would handle the heavy crops in this country was a different matter. In dry districts

it was not difficult to allow crops to ripen so that cutting and threshing were easily made one operation. The vigorous growth of straw in Western Canada presented a more difficult problem. Here the wheat had often to be cut early for fear of frost and being on the green side could not be threshed at once.

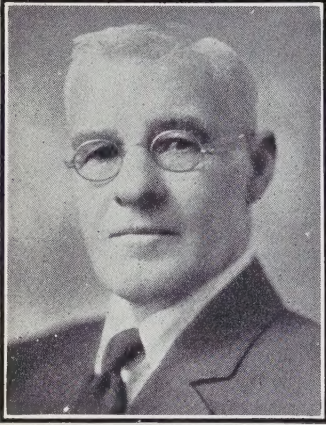
To handle crops of this kind the machine companies designed a swather to cut the grain and drop it where it could dry and ripen, to be later picked up and threshed by the combine, the operations of which are described in this article.

The result of one year's experience with these machines is not sufficient to pronounce upon them in definite terms. They have many friends and some opponents, but all the circumstances under which a farmer is operating must be taken into account when a decision is made in respect to the purchase of them. One difficulty with farm machinery is that purchases are sometimes made when the value of the crop does not justify so large an outlay, but a man must be allowed to exercise his judgment in matters of this kind.

Where oats form a large part of a farmer's crop and he is keeping live stock, the binder, that saves the straw and doesn't leave high stubble, would seem to be the best plan of cutting. It is almost imperative to burn the stubble after a combine and this is a wasteful process and must rob the soil of necessary fibre. On the other hand, the elimination of extra help in harvest at high wages has been long looked for by many farmers.

There will be localities and conditions that favor the combine and others where it will not be advisable to use it. The man with a small crop might contract for his wheat to be cut and threshed this way and might harvest his oats in the old way. It is a problem that will likely be more or less unsettled for some time. We endeavored to find a man who was farming upon a reasonably sized plan, to give his experience with a combine.

Mr. D. N. McIntyre, who has farmed for some twenty years near Meadows, Manitoba, consented to prepare a statement for us. Mr. McIntyre was one of the early students at the Ontario Agricultural College, finishing his course there in 1885. He then farmed in Bruce County, Ontario, until he went West. He has been a farmer all his life and is not exclusively a grain farmer as he is now milking twenty cows on his farm at Meadows.



D. N. MCINTYRE

For part of two years Mr. McIntyre did very useful work in superintending the establishing of some of the Provincial Demonstration Farms in the Province of Alberta. His son, Hugh, is a graduate of the Manitoba Agricultural College, and for a few years was Instructor in Animal Husbandry in the Vermilion School of Agriculture, in Alberta, but is now farming a few miles from his father's place. From this it will be seen that Mr. McIntyre, while a practical farmer, is a well informed one, who takes a lively interest

in the scientific, as well as the practical, developments in farming. This is the type of man whom we asked to give a brief story of his first season's experience with a combine. Mr. McIntyre says:

Increased Demand "Some idea of the demand for combines among Western farmers may be obtained from the fact that in 1927 there were 598 combines at work in the three Prairie provinces, while in the harvest of 1928 the number had risen to 4,431. In the district in which I am farming we had no combines in 1927, while last harvest four of these machines were working in the four square miles about my farm. The tendency of crops to ripen unevenly, and the presence of a considerable quantity of green weeds in our crop made the swather a very necessary adjunct to the success of the combine. The latter implement, as its name would indicate, is a machine for cutting the grain, and after running it over a low elevator, it lays it in a swath on top of the stubble. The grain is so distributed in the swath that very many of the heads are exposed to the sun, thus facilitating the ripening and drying of the grain. This machine is constructed upon the right principle but requires some mechanical adjustments before it will be entirely successful. These changes are being made by the machine companies for next season.

Advantages of Swather “The swather is a means of speeding up harvesting, as by its use cutting may be begun as early as if the self binder was being used. The combine can be operated four or five days later and this gives the farmer a much better chance with his harvest. Where a swather is used, a pick-up machine, operated upon the plan of a hay loader, is used to pick up the swath and deliver it on the canvas of the combine from which it is elevated into the separator. When the pick-up is in use the knives and reel are removed from the combine.

“The machine I used this year on my farm cuts a fifteen foot swath and has a thirty horse-power gasoline motor for driving its machinery. It has a rotary cleaner for removing weed seeds, a sixty bushel grain tank, and will either scatter the straw or leave it in a swath. The grain may be cut quite close to the ground or a stubble twenty inches high may be left.

“We harvested some 800 acres last season with our combine, using the pick-up on about two-thirds of it and the balance was threshed as cut. A good deal of this was barley and we had very satisfactory results from the machine. We are quite sure it handled lodged grain as effectively as the self binder would, and once it was cut there was no further loss from badly tied and tangled sheaves, which would be poorly stooked and carelessly handled from the stooks to the thresher.

Handling Various Crops “In handling down grain it must be cut closer to the ground which means more straw to thresh and slower driving of the machine.

We combined, however, twenty-five acres of badly lodged wheat in eight hours, and made about the same progress with barley that was heavy and badly lodged. My opinion is that it pays to cut barley with the swather as there is apt to be a loss, from heads broken off, if it is left to ripen enough to thresh it as it is cut. The machine worked excellently in flax. We have harvested considerable flax in the last twenty years and never did we dispose of a crop with the same neatness and despatch as we did this year with the combine.

“In a fair crop of barley that had been cut with the swather, we picked up and threshed forty acres in eight hours. If your

land is stony you had better gather the surface ones, as small stones are apt to be picked up and they don't thresh well.

"The swather can be operated under any weather conditions that will permit a binder to work, but heavy dews or any dampness must be avoided when the threshing operations are in progress, which frequently shortens your hours of work. Two or three men with the combine and pick-up can harvest 800 acres of grain with comparative ease and this is a great relief to the farm women who always had a burden of work in cooking for harvesters and threshers.

"We have our own threshing machine and we cut our oats with the binder and threshed them so as to have the straw for bedding, and have been making some comparisons in costs. We estimate that our fifteen-foot combine will thresh about 75% of what a threshing mill with a 28-inch cylinder will do. We are not calculating interest or depreciation which we think would be about the same in each case.

"Making our calculations on the handling of 100 acres of crop, it will work out about as follows:

"Cost of cutting 100 acres with the swather—

Gas for tractor.....	\$ 8.50
Oil for tractor and machine.....	3.00
Man to operate.....	17.50
	\$29.00

"Cost of operating pick-up and combine—

Gas for separator motor.....	\$17.00
Lubricating oil for same.....	4.25
Gas for tractor.....	17.00
Lubricating oil for tractor.....	4.25
Two men to operate.....	47.50
	\$90.00

"Making a total cost of \$119.00 to cut 100 acres with the swather, and pick-up and thresh it with the combine, or at the rate of \$1.19 per acre.

"Cost of cutting 100 acres with the binder, stooking and threshing it—

4-horse team and man for binder.....	\$70.00
Binder twine.....	35.00
Stooking, two men.....	40.00
Threshing, 6 men, 8 teams, 2 spike pitchers....	130.00

Gas for engine.....	16.50
Lubricating oil.....	4.00
Machine operator.....	17.50

TOTAL COST.....\$313.00

“Making the harvesting and threshing cost for 100 acres amount to \$313.00 or \$3.13 per acre, or \$1.94 per acre more than the cost of operating the combine and swather which, on 800 acres of crop, comes to a snug amount. If you can cut part of your crop with the combine and eliminate the swather you save a further 29 cents per acre. Harvesting crops in these days of high wages and more or less uncertain yields becomes a purely economic problem and it was upon this basis we purchased a combine.”



Champion Highland bull at the Highland Society Show, Scotland

CHAPTER XVIII

CARE OF MACHINERY

EARLY March is the time for the farmer to "oil up" for the spring work. There is nothing about a farm more essential than oil. When the wheels are greased, they run smoothly, the labor is lighter, and the wear upon the machinery is greatly reduced. It is a good plan in the early Spring to get your seed grain cleaned ready for sowing. When seeding begins, farmers are loath to miss a day as in any part of Canada the early sowing is usually the best, and in the West every day counts in the race to beat the frost in the Fall.

Clean Seed Grain If seed is not cleaned and set aside before farmers can get on the land, the work of cleaning is apt to be neglected. If you are in the rush of seeding, a very perfunctory cleaning is often all it gets and the result is an inferior crop. "Whatsoever a man soweth, that shall he also reap." If all weed seeds are not removed from your seed grain, you are sowing weeds to choke your crop. If small or immature grain is sown, you will fail to have either as many plants as you desire or as vigorous ones. If you want a good crop, you must sow good clean seed from which you have fanned all the light grains and sifted all the weed seeds.

The Fanning Mill The fanning mill is your first implement to be used in the early Spring. It will pay to have a good mill and plenty of screens for it, and to run your grain through two or three times. You'll have plenty of weeds without deliberately planting them. A fanning mill has very little machinery about it, so the necessity of oiling it is often overlooked. It does a good deal of work, however, almost all of which is done on two bearings and so needs oil frequently and oil with a good body so it will cling to the shaft. Try turning it as it stands, then oil it up carefully, seeing that all the shaker hinges are well greased as well as the bearings and see how much easier it runs. The oil will save wear and lighten the labor.

If your mill is driven by a small gasoline engine, as it should be where you have large quantities of grain to clean, see that the engine is well lubricated.

The Grain Drill Early March is none too soon to get your grain drill ready for action. Seeding grain is a business of days and in this work hours often count greatly. If the land is ready and the weather fine and you miss a day, or even half a day, and then the weather breaks, you are in rather a bad way.

The grain drill, consequently, should be ready to start and in such condition that you need have little fear of its giving out.

Take every disc off your drill (if it is a disc drill as most now are) and have a bucket with some coal oil and a stiff brush. Scour about the bearings where dust got in last year. Look over the springs and replace every one that is broken or in bad condition. Clean out all dirt from the grease cups and fill them with the best grade of hard oil (such as Imperial Thresher Hard Oil and Imperial Arctic Cup Grease or Imperial Polarine Cup Grease). See that the grease is getting down to every bearing. Remove the wheels, clean off the axles, and grease them well to save your power in pulling the drill. With every disc working freely, every spring of good tension, and all oiled to run smoothly, you will do a good job of planting your seed and so take the first step toward a good crop.

The Plow Look your plows over, have the shares laid or sharpened where needed, or replaced by new ones when necessary, and see that the coulthard is in good shape. If the plow has wheels don't forget to grease them well, cleaning off the bearings first. If the bearings are loose and worn, replace them, and then keep them greased so they will not wear out so quickly again. When you are through using the plow for a time take a box of Mica Axle Grease and cover the mould board and land side with it. This is important when laying the plow up for Winter. When you begin to use it again the

board will "clean" at once so that the plow works better, making it lighter in draught for the horses and pleasanter for the plow man. This is highly important if you are working clay land, and well worth doing in any event.

The Tractor If you are using a tractor, get it ready for the rush season in the Spring. Go over all the bearings and see that the oil pipes are clear. Some tractors have the splash system of oiling, but they have also a force feed. See that the oil is getting to the right place and that the right amount is being delivered. Be sure, too, that you are using the correct grade of oil. (See Recommendation Chart at the back of this book.)

Oil is the life of a tractor. It cannot run without fuel, of course, but when the gas runs out it only stops. When the oil system fails to work the "stop" is of a much more permanent character. Don't think because it's a tractor that any kind of oil will do. Tractors require oil as carefully selected as a motor car, so use the quality and grade of oil your tractor requires. The use of a good oil, such as Imperial Marvelube, can lengthen the life of this expensive machine and save you hundreds of dollars. Use only oil the quality of which is backed by a company jealous of the reputation of its product.

Coal oil is the champion cleanser for a tractor, as well as for other machines, and it is as important to get bearings clean as it is to oil them afterwards. Don't forget that a tractor runs on wheels and see that the bearings are in good condition and running in oil. It will keep the machine moving easier.

It is important that you get your tractor in shape and it is quite as important to feed your horses a little more grain, and use them whenever you can to get them in condition and their shoulders hardened to the collars for Spring work. The harness should have been repaired during the Winter, and it should be thoroughly oiled with a suitable oil such as Imperial Eureka Harness Oil. Oil preserves leather and makes it pliable to handle and work with. If you plan using any larger hitches, get your whiffletrees and eveners ready so you can hitch at the first opportunity and get ahead with the work.

Disc Harrow You may have some Fall plowing that needs cultivation in the Spring with a disc, so have your disc harrow ready. Look over the bearings to see that they are all tight. If any are loose and worn, replace them—it will pay. All the later makes of discs use machine-oil and grease instead of hard oil. See that the long pipes that carry it down to the bearings are open and free from dirt. Nothing will grind out more quickly than a disc if the oil is not reaching the bearings, as the working of the discs over the uneven furrows in the land increases the wear in places, and if it begins to cut, it wears out quickly. If your disc has a tongue truck, don't forget the wheels of it. Every wheel needs oil. The disc needs a good grade of heavy oil. Cheap or thin oils are a waste of money and will only give you grief in the end.

Be Ready There are several periods in the year when the farmer must be ready to move full speed ahead, but none of them more important than seeding. A day missed may mean a week lost, which might result in a light crop because of early ripening through a hot July and August in the East, or loss through an early frost in the West. Be ready to get ahead with your work in the Spring and you improve your chances for a crop.

The Manure Spreader The manure spreader is an implement that above all others, should be cleaned and greased as often as it is used. See that the gears are all well cleaned out, the bearings oiled and the cog wheels greased. See that the apron runs smoothly and oil all the castors over which it runs. Look over the slats carefully and if any are broken or cracked replace them with new ones. A broken slat, when the machine is in use might cause damage which it would cost a good deal of money to repair. Keep the driving wheels well greased and so lighten the load upon this heavy drawing implement.

The Mower When haying time is approaching the mower should be put in order. All the bearings should be gone over and if any are badly worn they should be replaced. Mowers are frequently thrown aside and replaced by new ones

when a new outfit of bearings, with other minor repairs, would have made the machine almost as good as new.

If bearings are worn out it will probably be largely from want of oil. See that the oil holes are all open and clean and keep a lookout that the oil is always getting down so as to lengthen the life of the new bearings. Keep all the bearings of the mower swimming in oil. Oil is cheaper than repairs. The pitman runs fast. See that it is well oiled.

Use a good heavy oil for the gears of the mower. These cog wheels run fast and have heavy work to perform, so be sure to have oil with some body to it that will cling to the gears and so keep them meshing smoothly. Don't get the idea that any cheap oil will do for your mower. Machines are expensive these days and oil that will lengthen their lives is a profitable investment.

Replace any worn or broken sections on the knife. Grind it and also sharpen the ledger plates on the guards. If any guards are broken replace them. If the top parts of them are bent up, drive them down with a hammer. See that the knife runs smoothly through the guards and is held firmly against the ledger plates by the clips. If you want a clean cutting machine the sections of the knife must work closely with the ledger plates in the guards. Sprinkle oil along the knife bed. It will make it run more smoothly.

Don't Overlook This There is one adjustment about a mower that is often overlooked. There is an adjusting rod running from the inside shoe of the mower bar to the frame of the machine. This rod has adjusting nuts on it by means of which the angle of the mower bar can be altered. Run your mower knife by hand and see if the sections of the knife centre in the guards at the end of the outward stroke, and make a clean cut to the centre of the guards on the return stroke.

If the sections fail to make a clean cut both ways then you are pulling some grass which makes the work hard on your mower and on your horses. The effect is much the same as that on your hair when the barber's clippers fail to make a clean cut.

If the knife does not make a clean cut, turn the nuts on the adjusting rod until you bring the mower bar into such a position, that it does. This is an important adjustment to make on your mower during a season's work.

See that the grass board is in good shape and does its work well at the outer end of the cutter bar. It is important for good work on the next round to have a clean strip along the standing hay.

Rakes and Tedders Where sulky rakes, tedders, side delivery rakes and hay loaders are used, give them a good supply of oil. The very fact that there is not much about some of them to oil or grease is the main reason why they are often neglected.

Binder or Harvester There is a good deal of machinery about a binder. It takes some patience and work to oil it completely, and in the hurry of harvest it is often neglected, which is a great mistake. The binder should be prepared for harvest some weeks before it is needed. There is always a question as to whether or not it is going to run smoothly, so it should be tested out and be all ready to hitch to and do a full day's work immediately it is called upon to operate.

Clean out all the oil holes and see that the oil is running freely into every bearing. This will require some careful work. See that the drive chains are in good condition; this, of course, includes the bull chain. If either of these chains are inclined to jump off *get a new chain*. Don't waste time trying to fix it with new links, you will only get more grief—get a whole new chain and keep the new one drenched with oil so it will wear three times as long as the last one.

Fill the bull wheel with oil. Though it is not easy to get at always remember that it goes around and needs lubrication. On most binders there is an arrangement to adjust the bevel gears on the bull wheel. Next to the bull wheel, or main drive wheel there is a lock nut, kept tight with a set screw, which makes contact with a thrust bearing. See that this is adjusted so the bevel gears mesh well, but are not tight enough to bind.

Clean off the canvas rollers, and see that oil is reaching them. Also see that they are running free and not binding; if they are they can be adjusted by the brackets that hold them in place.

Go carefully over the knotter and see that it is working smoothly, that the knife which cuts the twine is sharp, and that the spring in the tension on the twine is working free. If any parts of the knotter are worn out replace them before you begin work and see that every bearing in it is running in oil.

Go over the canvases and replace every broken slat or strap, having them repaired so as to work freely and be strong enough to stand the strain. See that the knife sections and guards are in good shape and cutting cleanly.

Make definite calculations as to how often you will oil up your machine and don't neglect to stop and do it. Every morning and noon before beginning work it should be gone over with extra care, not only to see that it is oiled, but that all the oil holes are open and that no bearing is dry. Use a good grade of oil that will last and so keep the machine running smoothly.

The Combine The combine is practically a new machine in Canada but its extra mechanism calls for just that much more care in giving it a liberal supply of oil. This machine performs a good many operations and is expensive to buy, consequently its life should be prolonged by careful oiling and greasing to lessen the wear and reduce the strain in pulling it while in operation. The more complex the machine the greater the care required to keep it running with the least friction.

Wintering Machines When the work of any farm machine is over for the season it is a good plan to take a can of hard oil and plaster every bearing with it, covering up these parts so as to exclude all moisture. A good deal of machinery stands out all Winter in Western Canada. Housing is desirable, but when impossible, the machine can be protected with a generous coating of grease.

Whether or not the machines are housed, the grease application is an excellent thing, as it prevents rusting, keeps out dust and moisture and preserves the bearings in good running order for the following season. This is a little attention that will pay a big dividend.

Tractor Lubrication Chart

Imperial Marvelube Tractor Oils

The following recommendations are based upon careful study of the design of each engine and an intimate understanding of its lubricating requirements.

For engine lubrication, follow the Winter recommendation as made on this chart for temperatures ranging from 32° F. to zero F. Below zero F. use Marvelube Medium in all motors. For transmission and differential lubrication at temperatures of 20° F. and below, use Polarine Transmission Oil "W," where the chart recommends Polarine Transmission Oil.

MAKE OF TRACTOR	ENGINE		Trans- mission	Differ- ential
	Summer	Winter		
A				
Allis-Chalmers (12-20 and 15-25).....	EH	H	P.T.	P.T.
Allis-Chalmers (All Other Models).....	SH	H	P.T.	P.T.
All Work.....	EH	H	P.T.	P.T.
Appleton.....	SH	H	P.T.	P.T.
Aro.....	H	H	P.T.	....
Avery.....	EH	H	"L"	"L"
B				
Baker.....	SH	H	P.T.	P.T.
Baldwin.....	H	LM	X	....
Bates.....	SH	H	P.T.	....
Beaver (Canada).....	SH	H	P.T.	P.T.

KEY TO ABBREVIATIONS	
LM—Marvelube Light Medium	EH—Marvelube Extra Heavy
H—Marvelube Heavy	L—Polarine Grease "L"
SH—Marvelube Special Heavy	PT—Polarine Transmission Oil
M—Marvelube Medium	X—Engine Oil

MAKE OF TRACTOR	ENGINE		Trans- mission	Differ- ential
	Summer	Winter		
Belle City Crawler	SH	H	P.T.	P.T.
Best	EH	H	P.T.	P.T.
Boiens	H	M	....	....
C				
Canadian Special	SH	H	P.T.	....
Case Harvester Threshers	SH	H	....	....
Case (Model 22-40, 25-45, 40-72)	EH	H	P.T.	P.T.
Case (All Other Models)	SH	H	P.T.	P.T.
Caterpillar Combine Harvester (Model 30) ..	EH	H	....	....
Caterpillar Combine Harvester (Model 32) ..	SH	H	....	....
Caterpillar (All Other Models)	EH	H	....	....
Cletrac (Model K—with power take off)	SH	H	X	X
Cletrac (Model 100)	SH	H	X	....
Cletrac (Models W, 20, 30)	SH	H	P.T.	....
Cletrac (All Other Models)	SH	H	P.T.	P.T.
D				
Deering Harvester Thresher	SH	H	....	....
E				
E-B	EH	H	P.T.	P.T.
E-W-C (5 Ton)	EH	H	P.T.	....
E-W-C (Model 80)	SH	H	P.T.	....
Eagle	SH	H	X	X
F				
Fageol	SH	H	P.T.	....
Farm-All	SH	H	P.T.	P.T.
Federal	H	....	....	....
Fitch Four Drive	EH	H	P.T.	P.T.
Flour City	EH	H	"L"	"L"
Fordson	SH	H	P.T.	P.T.
Frick (Model A)	EH	H	P.T.	P.T.
Frick (All Other Models)	SH	H	P.T.	P.T.

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M—Marvelube Medium

EH—Marvelube Extra Heavy
L—Polarine Grease "L"
PT—Polarine Transmission Oil
X—Engine Oil

MAKE OF TRACTOR	ENGINE		Trans- mission	Differ- ential
	Summer	Winter		
G				
Gleaner.....	SH	H	P.T.	....
Gray.....	SH	H	P.T.	....
Gromor.....	SH	....	....	....
H				
Haiss Fordson.....	SH	H	P.T.	P.T.
Harris Combine.....	SH	H	....	....
Hart Parr.....	EH	H	P.T.	P.T.
Heider (Cultivator).....	H	H	P.T.	P.T.
H				
Heider (D-9-16).....	SH	H	P.T.	P.T.
Heider (All Other Models).....	SH	H	P.T.	P.T.
Hines Combine.....	EH	H	....	....
Huber (Model 12-25).....	SH	H	P.T.	P.T.
Huber (15-30).....	SH	H	P.T.	P.T.
Huber (All Other Models).....	EH	H	P.T.	P.T.
I				
Imperial (Canada).....	EH	H	P.T.	P.T.
Indiana.....	H	H	P.T.	P.T.
J				
J.T.....	EH	H	P.T.	P.T.
John Deere.....	SH	H	P.T.	P.T.
K				
Kay-Gee.....	SH	H	P.T.	P.T.
Kennison.....	EH	H	P.T.	P.T.
Kinkead.....	H		L	
Kinkade.....	H	H	X	
L				
Lauson (Midwest Engine).....	EH	H	P.T.	P.T.

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PT—Polarine Transmission Oil
X—Engine Oil

MAKE OF TRACTOR	ENGINE		Trans- mission	Differ- ential
	Summer	Winter		
Lauson (All Other Models).....	SH	H	P.T.	P.T.
Little Giant.....	SH	H	P.T.	P.T.
Lombard (Wisconsin Engine).....	SH	H	P.T.	P.T.
Lombard (All Other Models).....	EH	H	P.T.	P.T.
M				
Massey-Harris Farm Machinery.....	SH	H	....	....
McCormick (Harvester Thresher).....	SH	H	....	....
McCormick Deering (Harvester Thresher)...	SH	H	....	....
McCormick Deering (All Other Models)....	SH	H	P.T.	P.T.
Mead Morrison.....	EH	H	P.T.	P.T.
Minneapolis (17-30 and 17-30B).....	EH	H	P.T.	P.T.
Minneapolis (All Other Models).....	EH	H	X	X
Monarch (6 Ton).....	EH	H	P.T.	....
Monarch (All Other Models).....	SH	H	P.T.	....
Motor Macultivator.....	H	M	....	....
N				
New Britain (N.B.).....	SH	H	X	X
Nichols & Shepard.....	SH	H	L	L
Nilson.....	SH	H	P.T.	....
North Star.....	H	H	L	....
O				
Oil Pull.....	EH	H	P.T.	P.T.
P				
Pioneer (Model 30).....	EH	H	P.T.	P.T.
Pioneer (All Other Models).....	EH	H	X	X
R				
Red E.....	EH	H	X	....
Red River Special (Thresher and Combine)..	SH	H		
Reliable.....	EH	H	P.T.	L
R. I. Heider (Model M2) (Cultivator).....	H	H	P.T.	P.T.

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M—Marvelube Medium

EH—Marvelube Extra Heavy
L—Polarine Grease "L"
PT—Polarine Transmission Oil
X—Engine Oil

MAKE OF TRACTOR	ENGINE		Trans- mission	Differ- ential
	Summer	Winter		
R				
R. I. Heider (All Other Models).....	SH	H	P.T.	P.T.
Rogers.....	EH	H	P.T.	P.T.
Russell.....	EH	H	P.T.	P.T.
S				
Shaw.....	H	M	....	....
Shaw Duall.....	H	M	....	....
Shaw Enochs.....	SH	H	P.T.	P.T.
Sprywheel.....	LM	LM	L	....
Standard.....	H	H	X	....
Star.....	H	M	....	....
T				
Toro (Golf Machine).....	H	H	P.T.	P.T.
Toro (Junior Golf Machine).....	H	....	X	P.T.
Toro (Park Special).....	H	....	....	....
Townsend.....	EH	H	....	....
Track Pull.....	SH	H	P.T.	P.T.
Traylor.....	H	H	P.T.	P.T.
Twin City (12-20, 20-35).....	SH	H	P.T.	P.T.
Twin City (All Other Models).....	SH	H	P.T.	P.T.
U				
Utilitor.....	H	H	....	....
W				
Wallis.....	SH	H	P.T.	P.T.
Walsh.....	H	....	....	....
Western Harvester Holt (Model 38).....	H	....	X	....
Western Harvester Holt (All Other Models).....	SH	H	....	....
Wetmore.....	SH	H	P.T.	P.T.
Wisconsin (Models EB, G & F).....	SH	H	P.T.	P.T.
Wisconsin (All Other Models).....	EH	H	P.T.	P.T.
Wizard 4 Pull (Model 20-35).....	EH	H	P.T.	
Wizard 4 Pull (All Other Models).....	SH	H	P.T.	P.T.
Y				
Yuba (25-40).....	EH	H	P.T.	P.T.

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Aberdeen Angus, 136.
 Aberdeen Angus Bull, 185.
 Acid Phosphate, 54.
 Acid Soils, 56.
 Alfalfa in Rotations, 84.
 Alfalfa forage plant, 100.
 Alfalfa, deep roots, 100.
 Alfalfa Inoculation, 101.
 Alfalfa pasture, 102.
 Alfalfa for seed, 102.
 Alfalfa on prairies, 104.
 Alfalfa as Hog pasture, 173.
 Andrew Anderson's Grounds, 113.
 Ayrshire Cows, Royal Winter Fair, 154.
 Ayrshires, 146.
 Ayrshire Cow, Springburn Lady Beauty 2nd, 147.
 Ayrshire Bull, 190.

 Bacon Hogs, 171.
 Banner Oats, 65.
 Barnyard Manure, 51.
 Barley, 66.
 Barley, Varieties, 67.
 Barred Rocks, 110.
 Beef Cattle, 131.
 Beef Cattle Feeding, 138.
 Belgian Horses, Sask., 68.
 Belgian Horses, 127.
 Belgian Stallion, 128.
 Belgian Geldings in Antwerp, 169.
 Berkshires, 170.
 Berkshire Boar, 172.
 Binder, 215.
 Blackcap Revolution, Angus Bull, 186.
 Blue Grass, Kentucky, 96.
 Blue Grass, Canadian, 96.
 Boar, Selection of, 195.
 Boar, Berkshire, 172.
 Boar, Yorkshire, 196.
 Boyd, W. W., on selection of a Hereford Bull, 187.
 Breeding Hogs, 172.
 Brome Grass, 98.
 Bull, Shorthorn, 184.
 Bull, Aberdeen-Angus, 185.

Bull, Col. Bartley, on selection of Jersey Sire, 191.
 Bull, Jersey, 191.
 Bull, Hereford, 187.
 Bull, Holstein-Friesian, 188.
 Bull, Ayrshire, 190.
 Bull, Guernsey, 193.
 Bull, Highland, 209.
 Bunch Perennials, 43.

 Canada Thistle, 43.
 Canadian Blue Grass, 96.
 Carlyle, S. G., on Feeding Dairy Cattle, 153.
 Carlyle, W. L., on Selection of Draught Stallion, 182.
 Cattle, on A.7 Ranch, 38.
 Cattle, Beef, 131.
 Cattle, Shorthorn, 131.
 Cattle, Hereford, 135.
 Cattle, Aberdeen-Angus, 136.
 Cattle, Beef, Feeding, 138.
 Cattle, Dairy, 143.
 Cattle, Holstein-Friesian, 144.
 Cattle, Ayrshire, 136.
 Cattle, Jersey, 148.
 Cattle, Guernsey, 151.
 Cattle, Shorthorn Bull, 184.
 Cattle, Aberdeen-Angus Bull, 185.
 Cattle, Hereford Bull, 187.
 Cattle, Holstein-Friesian Bull, 188.
 Cattle, Ayrshire Bull, 191.
 Cattle, Guernsey Bull, 193.
 Clydesdale Mare, Queen of Willowdale, 19.
 Clydesdale Stallions, Indian Head, 55.
 Clydesdales in Scotland, 121.
 Clydesdales, 125.
 Clydesdale Stallion, Craigie Ambition, 124.
 Clydesdale Filly, Doune Lodge, Princess, 197.
 Clover, Dutch, 94.
 Clean Seed, 24.
 Couch Grass, 44.
 Commercial Fertilizer, 53.

Corn for Ensilage, 75.
Crop Rotation, 83.
Crops Grow, 16.
Cultivation, Spring, 19.
Cultivate Growing Crop, 21.
Cultivating Summer Fallow, 30.

Dairy Cattle, 143.
Dairy Cattle Feeding, 153.
Disc Harrow, 213.
Don Valley Scene, 26.
Draught Stallion, Selection of, 182.
Drainage Necessary, 16.
Drill for Grain, 211.
Dryden, W. A., on selection of a Shorthorn Bull, 184.
Dry Farming, Robt. Gratz, 33.
Durum Wheat, 60.
Dutch, White Clover, 94.
Ducks, 119.
Dunlop Radiance, Ayrshire Bull, 191.

Ensilage, Making, 75.
Ensilage, Corn, 75.
Ensilage, Sweet Clover, 76.
Ensilage, Sunflower, 77.
Ensilage from Green Oats, 79.
Ensilage, Silo, 80.
Ensilage, Value in Feeding, 157.

Fall Plowing, 18.
Fall Wheat, Kharkof, 36.
Fall Wheat, 62.
Fanning Mill to Clean Grain, 24.
Fanning Mill, care of, 210.
Fertilizer, 51.
Fescue, Meadow, 94.
Feeding Poultry, 117.
Feeding Beef Cattle, 138.
Feeding Dairy Cattle, 155.
Feeding Sheep, 161.
Feeding Hogs, 173.
Flowers, 113.

Garden, Kitchen, 133.
Garnet Wheat, 59.

Geese, 119.
Germination Tests, 23.
Glencarnock Jessie 9th, Angus, 137.
Grass, Tall Oat, 94.
Grass, Brome, 98.
Grass, Western Rye, 98.
Gratz, Robt., Dry Farming, 33.
Grain Crops, 57.
Growing Crops, 16.
Guernseys at Grass, 26.
Guernseys at Royal Winter Fair, 86.
Guernseys, 151.
Guernsey Cow, Lilyetta of Chicon, 152.
Guernsey Bull, 193.
Grain Drill, 211.

Harvesting with Combine, 204.
Hay, 93.
Hens' Heads, 115, 116, 117, 118.
Hereford Female Grand Champ., 90.
Hereford Bull, Jr. Champ., 91.
Hereford Female, 107.
Herefords, 135.
Hereford, W. S. Gay Lass 414th, 134.
Hereford Bull, 187.
Highland Bull, 209.
Hogs, 171.
Hogs, Pasture, 173.
Hogs, Finishing, 175.
Hogs, Self Feeder, 177.
Hogs, Boar, 195.
Holstein-Friesian Cows, 49.
Holstein-Friesian, Abbekerk Sylvins Lad, 101.
Holstein-Friesians, 144.
Holstein-Friesian Bull, 188.
Holstein Cow, Oakhurst Colantha Abbekerk, 143.
Holtby, R. M., on Selection of Holstein-Friesian Bull, 188.
Horses, Large Team, 17.
Horses at Pasture, 106.
Horses, 124.

- Horses, Draught Stallion, 182.*
House Poultry, 117.
Humus, Value of, 17.
Humus restored by Sweet Clover, 28.
Humus adds warmth, 28.
Humus in Fertilizer, 51.

Implements, care of, 210.
Improvement of Soil by Sweet Clover, 28.

Jenkins, R. M., on Selection of a Guernsey Sire, 193.
Jersey, Brampton Excellent Paxie, 84.
Jerseys in Pasture, 99.
Jerseys, 149.
Jersey Cow, Brampton Bay Xenia, 149.
Jersey Bull, 191.
Jersey Volunteer, 192.
Jersey Cow, Brampton Washington Beth, 156.
Johanna Rag Apple Pabet, Holstein Bull, 189.

Kemptville School of Agriculture, Cutting Sweet Clover, 29.
Kentucky Blue Grass, 96.

Lambs, 163.
Lawn, 133.
Legumes in Rotation, 89.
Lime on Soils, 56.
Live Stock to Fight Weeds, 49.
Lubrication Chart, for Tractors, 217.

Machinery, Care of, 210.
Manure Spreader, 213.
Mangels, 82.
Marquis Wheat, 57.
Marquis Wheat, Production of, 71.
McEwen, Col. Robert, on selection of a Ram, 194.
McGregor, Hon. J. D., on selection of Aberdeen Angus Bull, 185.

McIntyre, D. N., on Harvesting with a Combine, 206.
McMillan, Thos., on Feeding Beef Cattle, 139.
Meadow Fescue, 94.
Mixed Grain Crops, 70.
Mixed Farming, 92.
Monarch's Rose, Percheron Mare, 123.
Monarch, Percheron Stallion, 126.
Moisture, Value of, 16.
Moisture, Conserving, 20.
Mower, 213.
Mustards, Weeds, 45.

Ness, R. R., on Selection of an Ayrshire Bull, 190.
Nitrogen from Sweet Clover, 26.
Nitrogen Stored in Soil by Leguminous Plants, 28.
Nitrate of Soda, 54.
Nitrates on Fall Wheat, 63.
Noble, Chas. S., Wheat and Land Packer, 36.

Oat Crop, Alberta, 24.
Oats, Wild, 47.
Oats, 63.
Oats, Varieties, 65.
Oats, Victory, 65.
Oats, O.A.C., 66.

Pasture, 93.
Pasture, Mixtures, 93.
Pasture, Care of, 100.
Pasture, Feeding on, 100.
Pasture, Alfalfa, 102.
Pasture for Hogs, 173.
Peas, 67.
Peas, Varieties, 68.
Pea Straw, 69.
Percheron Stallion, Laet, 61.
Percherons in Sask., 122.
Percheron Mare, Monarch's Rose, 123.
Percheron Stallion, Monarch, 126.
Percherons, 126.

Perennial Sow Thistle, 40.
Pigs, 171.
Pigs, Boar, 195.
Potash, 55.
Potatoes, 109.
Poultry, 144.
Poultry, Breeds, 155.
Planting Potatoes, 111.
Plowing, Fall and Spring, 18.
Prairie Summer Fallowing, 31.
Pure bred Livestock, 121.

Quack Grass, 42.

Rake, 215.
Ram, Selection of, 194.
Red Top, 96.
Renfrew Wheat, 59.
Reward Wheat, 59.
Revolution 7th, Angus Bull, 64.
Root Crops, 82.
Rotation of Crops, 87.
Rotations on prairies, 90.
Roots, Value in Feeding, 157.
Rothwell, Geo. B., on Selection of Bacon Type Boar, 195.
Rye, 69.
Rye Grass, Western, 98.

Saunders, Dr. Chas. E., on producing Marquis Wheat, 71.
Saunders, Dr. Wm., Work on Experimental Farms, 74.
Seed Selection, 23.
Seeds, How They Grow, 23.
Seeds, Test for Germination, 23.
Seed, Clean, 24.
Seed, Treated for Smut, 25.
Seed Bed, 20.
Seeding Wheat, 60.
School of Agriculture, Olds, Alberta, 22.
Self Feeder for Hogs, 177.
Sheep on Western Range, 95.
Sheep, 161.
Sheep, Grand Champ., Lincoln Ram, 164.
Sheep, Dishley Marinos, 168.

Sheep, Care of, 162.
Sheep, Grand Champion, South-downs, 162.
Sheep, Diseases, 166.
Sheep, Champ., Leicester Ram, 163.
Sheep, Grand Champ., Oxford Ram, 164.
Sheep, Breeds, 168.
Sheep, Ram, 194.
Shropshire Ram, 195.
Shetlands, 120.
Shires, 128.
Shire Stallion, Snelston Topper, 129.
Shorthorns at International Show, 88.
Shorthorn Cow, Dual Purpose, 97.
Shorthorns, Dual Purpose, at Royal Winter Fair, 103.
Shorthorns, 131.
Shorthorns at Sesqui-Centennial, 130.
Shorthorn Bull, Edellyn Favorite, 132.
Shorthorn Dual Purpose Cow, Miss Daisy, 158.
Shorthorn Dual Purpose Bull, Fairy Duke, 159.
Shorthorn Bull, Thornham Ministrel, 184.
Shorthorn Bull, Selection of, 184.
Shrubs and Trees, 144.
Silo Construction, 80.
Silos, 81.
Sire, Selection of, 179.
Sire, Importance of, 181.
Sire, Shorthorn Bull, 184.
Sire, Aberdeen-Angus Bull, 185.
Sire, Hereford Bull, 187.
Sire, Holstein-Friesian Bull, 188.
Sire, Ayrshire Bull, 190.
Sire, Jersey Bull, 191.
Sire, Guernsey Bull, 193.
Sire, Ram, 194.
Sire, Boar, 195.
Smith, W. L., Interview with Dr. C. E. Saunders, 71.

- Spraying Potatoes*, 122.
Stallion, Draught, 182.
Soil Cultivation, 15.
Spring Plowing, 18.
Spring Cultivation, 19.
Steer Feeding, 139.
Steers, Alberta, University, 140.
Stink Weed, 46.
Storing Roots, 85.
Storing Potatoes, 122.
Structure of Soil, 15.
Succulent Feeds, 75.
Suffolk Sheep, 48.
Summer Fallowing, 27.
Summer Fallowing on prairies, 31.
Summer Fallowing, S. Melville Webb, 32.
Sunflowers for Ensilage, 78.
Superphosphate, 54.
Sussex, Light, 114.
Swather, 207.
Sweet Clover for Fertilizer, 27.
Sweet Clover for Nitrogen, 28.
Sweet Clover Improves Soil, 28.
Sweet Clover for Ensilage, 76.
Sweet Clover in Rotation, 89 and 92.
Sweet Clover as Forage Plant, 105.
Sweet Clover Varieties, 108.
Sweet Clover for Hog Pasture, 173.

Taggart, J. G., on Uses of a Tractor, 198.
Tall Oat Grass, 94.
Tamworth Hogs, 174.
Texture of Soil, 15.

Timothy, 96.
Tractor, 198.
Tractor in Ontario, 202.
Tractor, Care of, 212.
Tractor, Lubrication Chart, 217.
Trees and Shrubs, 114.
Tumbling Mustard, 45.
Turkeys, 118.
Turnips, 82.

Victory Oats, 65.

Webb, S. Melville, Summer Fallowing, 32.
Weeds, Summer Fallowing, 25.
Weeds and their eradication, 39.
Weeds, effect of Fertilizer, 53.
Western Rye Grass, 98.
Wet Lands should not be worked, 15.
Wheat, 57.
Wheat, Marquis, 57.
Wheat Field on prairies, 58.
Wheat, Garnet, Reward, Renfrew, 59.
Wheat Durum, 60.
Wheat, Seeding, 60.
Wheat, Fall, 62.
Wheat, Fall, Nitrates, 63.
Wild Oats, 47.
Winter Wheat, Kharkof, 36.
Wintering Machines, 216.

Yorkshire Sow, 52.
Yorkshire Gilts, 175.
Yorkshire Boar, 196.



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